
REQUEST FOR PROPOSAL

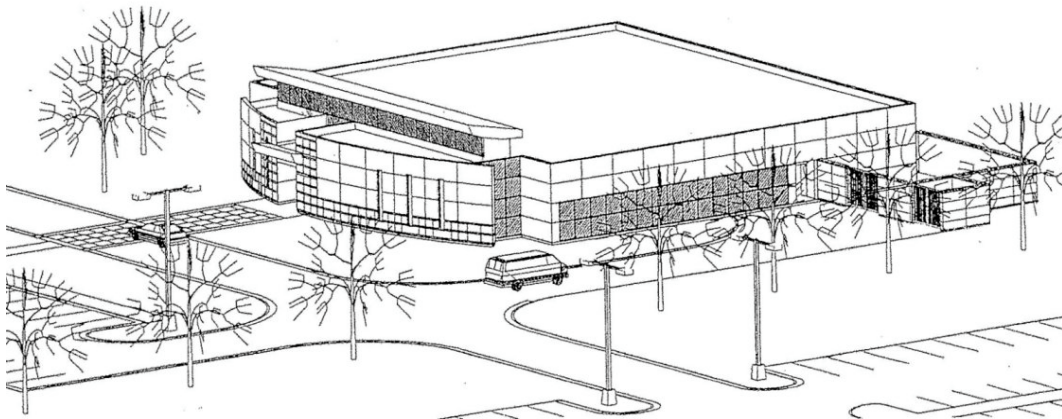
DESIGN/BUILD CONTRACT FOR

SOLICITATION NO. DACA45-02-R-0040

MEDICAL/DENTAL CLINIC

PDC: 52320/GLEN 023001

SCHRIEVER AIR FORCE BASE, COLORADO



JULY 2002



**AIR FORCE
SPACE COMMAND**



**US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT**

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MEDICAL/DENTAL CLINIC

SCHRIEVER AFB, COLORADO

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SOLICITATION, OFFER, AND AWARD (Construction, Alteration, or Repair)	1. SOLICITATION NO.	2. TYPE OF SOLICITATION	3. DATE ISSUED	PAGE OF PAGES
	DACA45-02-R-0040	<input type="checkbox"/> SEALED BID (IFB) <input checked="" type="checkbox"/> NEGOTIATED (RFP)	19 JUL 2002	1 OF 4

IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO.	6. PROJECT NO.
7. ISSUED BY	CODE	8. ADDRESS OFFER TO
	CT	
U S ARMY ENGINEER DISTRICT, OMAHA 106 South 15th Street Omaha, Nebraska 68102-1618		U.S.ARMY CORPS OF ENGINEERS, OMAHA Attn: CONTRACTING DIVISION (CENWO-CT) 106 South 15th Street Omaha, Nebraska 68102-1618
9. FOR INFORMATION CALL:	A. NAME	B. TELEPHONE NO. (Include area code) (NO COLLECT CALLS)
	See SECTION 00100, Para. 15	See SECTION 00100, Para. 15

SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS (Title, identifying no., date):

The Offeror hereby agrees to do all the work described in these documents entitled:

MEDICAL/DENTAL CLINIC
 PDC# GLEN 023001
 SCHRIEVER AFB, COLORADO

RETURN WITH BID: SECTIONS 00010 (SF1442 Pages 1 & 2 and Pricing Schedule Pages 3 & 4)

OTHER BONDING INFORMATION: SEE CONTRACT CLAUSES CLAUSE "FAR 52.228-15 PERFORMANCE AND PAYMENT BONDS".

For Proposal Information See Section:00110: Proposal Instructions, Submission Requirements and Evaluation

* See Section 00110 for required number of copies.

11. The Contractor shall begin performance within 10 calendar days and complete it within 480 calendar days after receiving
☐ award, ☒ notice to proceed. This performance period is ☒ mandatory, ☐ negotiable. (See _____.)

12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS?
 (If "YES," indicate within how many calendar days after award in Item 12B.)

☒ YES ☐ NO

12B. CALENDAR DAYS

10

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and * copies to perform the work required are due at the place specified in Item 8 by 1400 (hour) local time 19 AUG 2002 (date). If this is a sealed bid solicitation, offers must be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee ☐ is, ☒ is not required.

C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.

D. Offers providing less than 60 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

14. NAME AND ADDRESS OF OFFEROR (Include ZIP Code) DUNS Number:				15. TELEPHONE NO. (Include area code)				16. REMITTANCE ADDRESS (Include only if different than Item 14)			
CODE FACILITY CODE											
17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within <u>60</u> calendar days after the date offers are due. (Insert any number equal to or greater than the minimum requirement stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.) <div style="display: flex; justify-content: space-between;"> <div style="width: 15%;"> AMOUNTS </div> <div style="width: 85%;"> See Attached PRICING SCHEDULE. Contractor's Fax No. _____ CAGE CODE _____ Contractor's E-Mail address _____ </div> </div>											
18. The offeror agrees to furnish any required performance and payment bonds.											
19. ACKNOWLEDGMENT OF AMENDMENTS (The offeror acknowledges receipt of amendments to the solicitation - give number and date of each)											
AMENDMENT NO.											
DATE											
20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)						20B. SIGNATURE				20C. OFFER DATE	
AWARD (To be completed by Government)											
21. ITEMS ACCEPTED:											
22. AMOUNT				23. ACCOUNTING AND APPROPRIATION DATA							
24. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified)				ITEM <div style="border: 1px solid black; padding: 2px; display: inline-block;">26</div>		25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO <input type="checkbox"/> 10 U.S.C. 2304(c) () <input type="checkbox"/> 41 U.S.C. 253(c) ()					
26. ADMINISTERED BY CODE U.S. Army Engineer District, Omaha 106 South 15th Street Omaha, Nebraska 68102-1618				27. PAYMENT WILL BE MADE BY USAED Omaha c/o USACE Finance Center 5722 Integrity Drive Millington, TN 38054-5005							
CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE											
<input type="checkbox"/> 28. NEGOTIATED AGREEMENT (contractor is required to sign this document and return _____ copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications incorporated by reference in or attached to this contract.						<input type="checkbox"/> 29. AWARD (Contractor is not required to sign this document.) Your offer on this solicitation, is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.					
30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN (Type or print)						31A. NAME OF CONTRACTING OFFICER (Type or print)					
30B. SIGNATURE				30C. DATE		31B. UNITED STATES OF AMERICA BY				31C. AWARD DATE	

PROPOSAL SCHEDULE

Item No.	Description of Item	Unit	Unit Price	Amount
BASIC				
1.	Entire Work Complete for the Medical Dental Clinic (Construction Only), excluding Design Cost of Item 1 and Option Items listed Below.	JOB	L.S.	\$ _____
	Design Cost for Item 1	JOB	L.S.	\$ _____
TOTAL AMOUNT (BASIC)				\$ _____
OPTIONS				
O-1	Entire Work Complete for Interior rooms being provided with terminal Reheat coil units (VAV-TRH)	JOB	L.S.	\$ _____
	Design Cost for Item O-1			\$ _____
O-2	Entire work complete to provide landscaping in accordance with drawing L.01	JOB	L.S.	\$ _____
	Design Cost for Item O-2			\$ _____
O-3	Entire work complete to provide Clearstory Addition in accordance with drawings.	JOB	L.S.	\$ _____
	Design Cost for Item O-3			\$ _____
O-4	Additional cost to provide cut stone veneer in lieu of cultured stone veneer	JOB	L.S.	\$ _____
O-5	Cost to provide additional rough-ins for future sinks	JOB	L.S.	\$ _____
<u>GRAND TOTAL AMOUNT (BASIC + OPTIONS)</u> <u>FOR MEDICAL/DENTAL CLINIC</u>				\$ _____

NOTES:

1. See Section 00100, INSTRUCTIONS, CONDITIONS AND NOTICES OFFERORS, paragraph 3 EVALUATION OF OPTIONS for evaluation of bid items and options. The Government reserves the right to exercise the Options within 90 calendar days after Notice to Proceed (NTP). Evaluation of Options will not obligate the Government to exercise the option(s).
2. Prices must be entered for all line items on the Pricing Schedule. Grand total amount price submitted without prices for individual line items will not be evaluated. Additions will be subject to verification by the Government. In case of variation between the lump-sum prices and the grand total amount, the lump-sum prices will be considered the price.
3. A modification to the Pricing Schedule, which provides for a single adjustment to the grand total amount will not be accepted. Modification to Pricing Schedule items, basic or options, should state the application of the adjustment to each respective lump-sum price affected. If the modification is not so apportioned the Pricing Schedule item will not be evaluated.

SECTION 00100

INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS
(July 2000, Revised April 2002)

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SECTION 00100

INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS

1 DEFINITION OF "DESIGN-BUILD" PROCESS

The "Design-Build Process is the procurement of a facility utilizing a Request for Proposal (RFP) to solicit for the design and construction of a facility by a single contractual entity. The contractual entity may be a "Design-Build" firm, or joint venture between an architect-engineer (A-E) and construction firm, or a construction management (CM) firm joint venture with an A-E and a construction firm.

2 SOLICITATION RESTRICTIONS

2.1 GENERAL CONTRACTOR

This solicitation is unrestricted (not limited to small business concerns).

2.2 ESTIMATED DESIGN AND CONSTRUCTION COST.

The estimated design and construction cost of this project is between \$2,500,000 and \$5,000,000.

3 (FAR 52.217-5) EVALUATION OF OPTIONS (JUL 1990).

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. Evaluation of options will not obligate the Government to exercise the option(s).

4 (FAR 52.211-2) AVAILABILITY OF SPECIFICATIONS LISTED IN THE DOD INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) AND DESCRIPTIONS LISTED IN THE ACQUISITION MANAGEMENT SYSTEMS AND DATA REQUIREMENTS CONTROL LIST, DOD 5010.12-L (DEC 1999)

Copies of specifications, standards, and data item descriptions cited in this solicitation may be obtained—

- (a) From the ASSIST database via the Internet at <http://assist.daps.mil>; or
- (b) By submitting a request to the—

Department of Defense Single Stock Point (DoDSSP)
Building 4, Section D
700 Robbins Avenue
Philadelphia, PA 19111-5094
Telephone (215) 697-2667/2179
Facsimile (215) 697-1462.

(End of provision)

5 (FAR 52.215-1) INSTRUCTIONS TO OFFERORS--COMPETITIVE ACQUISITION (MAY 2001)

- (a) *Definitions.* As used in this provision—

"Discussions" are negotiations that occur after establishment of the competitive range that may, at the Contracting Officer's discretion, result in the offeror being allowed to revise its proposal.

"In writing," "writing," or "written" means any worded or numbered expression that can be read, reproduced, and later communicated, and includes electronically transmitted and stored information.

"Proposal modification" is a change made to a proposal before the solicitation's closing date and time, or made in response to an amendment, or made to correct a mistake at any time before award.

"Proposal revision" is a change to a proposal made after the solicitation closing date, at the request of or as allowed by a Contracting Officer as the result of negotiations.

"Time," if stated as a number of days, is calculated using calendar days, unless otherwise specified, and will include Saturdays, Sundays, and legal holidays. However, if the last day falls on a Saturday, Sunday, or legal holiday, then the period shall include the next working day.

(b) *Amendments to solicitations.* If this solicitation is amended, all terms and conditions that are not amended remain unchanged. Offerors shall acknowledge receipt of any amendment to this solicitation by the date and time specified in the amendment(s).

(c) *Submission, modification, revision, and withdrawal of proposals.* (1) Unless other methods (e.g., electronic commerce or facsimile) are permitted in the solicitation, proposals and modifications to proposals shall be submitted in paper media in sealed envelopes or packages (i) addressed to the office specified in the solicitation, and (ii) showing the time and date specified for receipt, the solicitation number, and the name and address of the offeror. Offerors using commercial carriers should ensure that the proposal is marked on the outermost wrapper with the information in paragraphs (c)(1)(i) and (c)(1)(ii) of this provision.

(2) The first page of the proposal must show—

- (i) The solicitation number;
- (ii) The name, address, and telephone and facsimile numbers of the offeror (and electronic address if available);
- (iii) A statement specifying the extent of agreement with all terms, conditions, and provisions included in the solicitation and agreement to furnish any or all items upon which prices are offered at the price set opposite each item;
- (iv) Names, titles, and telephone and facsimile numbers (and electronic addresses if available) of persons authorized to negotiate on the offeror's behalf with the Government in connection with this solicitation; and
- (v) Name, title, and signature of person authorized to sign the proposal. Proposals signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.

(3) *Submission, modification, revision, and withdrawal of proposals.*

- (i) Offerors are responsible for submitting proposals, and any modifications or revisions, so as to reach the Government office designated in the solicitation by the time specified in the solicitation. If no time is specified in the solicitation, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that proposal or revision is due.

- (ii)(A) Any proposal, modification, or revision received at the Government office designated in the solicitation after the exact time specified for receipt of offers is "late" and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late offer would not unduly delay the acquisition; and-

- (1) If it was transmitted through an electronic commerce method authorized by the solicitation, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of proposals; or

- (2) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of offers and was under the Government's control prior to the time set for receipt of offers; or

- (3) It is the only proposal received.

- (B) However, a late modification of an otherwise successful proposal that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

- (iii) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the proposal wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

- (iv) If an emergency or unanticipated event interrupts normal Government processes so that proposals cannot be received at the office designated for receipt of proposals by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation, the time specified for receipt of proposals will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

- (v) Proposals may be withdrawn by written notice received at any time before award. Oral

proposals in response to oral solicitations may be withdrawn orally. If the solicitation authorizes facsimile proposals, proposals may be withdrawn via facsimile received at any time before award, subject to the conditions specified in the provision at 52.215-5, Facsimile Proposals. Proposals may be withdrawn in person by an offeror or an authorized representative, if the identity of the person requesting withdrawal is established and the person signs a receipt for the proposal before award.

(4) Unless otherwise specified in the solicitation, the offeror may propose to provide any item or combination of items.

(5) Offerors shall submit proposals in response to this solicitation in English, unless otherwise permitted by the solicitation, and in U.S. dollars, unless the provision at FAR 52.225-17, Evaluation of Foreign Currency Offers, is included in the solicitation.

(6) Offerors may submit modifications to their proposals at any time before the solicitation closing date and time, and may submit modifications in response to an amendment, or to correct a mistake at any time before award.

(7) Offerors may submit revised proposals only if requested or allowed by the Contracting Officer.

(8) Proposals may be withdrawn at any time before award. Withdrawals are effective upon receipt of notice by the Contracting Officer.

(d) *Offer expiration date.* Proposals in response to this solicitation will be valid for the number of days specified on the solicitation cover sheet (unless a different period is proposed by the offeror).

(e) *Restriction on disclosure and use of data.* Offerors that include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, shall—

(1) Mark the title page with the following legend:

This proposal includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed—in whole or in part—for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of—or in connection with—the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets [*insert numbers or other identification of sheets*]; and

(2) Mark each sheet of data it wishes to restrict with the following legend:

Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal.

(f) *Contract award.* (1) The Government intends to award a contract or contracts resulting from this solicitation to the responsible offeror(s) whose proposal(s) represents the best value after evaluation in accordance with the factors and subfactors in the solicitation.

(2) The Government may reject any or all proposals if such action is in the Government's interest.

(3) The Government may waive informalities and minor irregularities in proposals received.

(4) The Government intends to evaluate proposals and award a contract without discussions with offerors (except clarifications as described in FAR 15.306(a)). Therefore, the offeror's initial proposal should contain the offeror's best terms from a cost or price and technical standpoint. The Government reserves the right to conduct discussions if the Contracting Officer later determines them to be necessary. If the Contracting Officer determines that the number of proposals that would otherwise be in the competitive range exceeds the number at which an efficient competition can be conducted, the Contracting Officer may limit the number of proposals in the competitive range to the greatest number that will permit an efficient competition among the most highly rated proposals.

(5) The Government reserves the right to make an award on any item for a quantity less than the quantity offered, at the unit cost or prices offered, unless the offeror specifies otherwise in the proposal.

(6) The Government reserves the right to make multiple awards if, after considering the additional administrative costs, it is in the Government's best interest to do so.

(7) Exchanges with offerors after receipt of a proposal do not constitute a rejection or counteroffer by the Government.

(8) The Government may determine that a proposal is unacceptable if the prices proposed are materially unbalanced between line items or subline items. Unbalanced pricing exists when, despite an acceptable total evaluated price, the price of one or more contract line items is significantly overstated or understated as indicated by the application of cost or price analysis techniques. A proposal may be rejected if the Contracting Officer determines that the lack of balance poses an unacceptable risk to the Government.

(9) If a cost realism analysis is performed, cost realism may be considered by the source selection authority in evaluating performance or schedule risk.

(10) A written award or acceptance of proposal mailed or otherwise furnished to the successful offeror within the time specified in the proposal shall result in a binding contract without further action by either party.

(11) The Government may disclose the following information in postaward debriefings to other offerors:

(i) The overall evaluated cost or price and technical rating of the successful offeror;

(ii) The overall ranking of all offerors, when any ranking was developed by the agency during source selection;

(iii) A summary of the rationale for award; and

(iv) For acquisitions of commercial items, the make and model of the item to be delivered by the successful offeror.

(End of provision)

6 CHANGES PRIOR TO RECEIVING OFFERS

The right is reserved, as the interest of the Government may require, to revise the specifications and/or Request For Proposal drawings prior to the date set for receiving offers. Such revisions will be announced by an amendment or amendments to this Request For Proposal. It shall be the responsibility of the prospective offeror, subcontractor or supplier to obtain copies of amendments from the website listed in paragraph: PLAN HOLDER'S LIST below. The Government may (but not required) send an amendment notification to let prospective offerors know that an amendment has been issued.]

7 (FAR 52.216-1) TYPE OF CONTRACT (APR 1984).

The Government contemplates award of a firm fixed price contract resulting from this solicitation.
(End of provision)

8 (FAR 52.204-6) DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER (JUNE 1999)

(a) The offeror shall enter, in the block with its name and address on the cover page of its offer, the annotation "DUNS" followed by the DUNS number that identifies the offeror's name and address exactly as stated in the offer. The DUNS number is a nine-digit number assigned by Dun and Bradstreet Information Services.

(b) If the offeror does not have a DUNS number, it should contact Dun and Bradstreet directly to obtain one. A DUNS number will be provided immediately by telephone at no charge to the offeror. For information on obtaining a DUNS number, the offeror, if located within the United States, should call Dun and Bradstreet at 1-800-333-0505. The offeror should be prepared to provide the following information:

(1) Company name.

(2) Company address.

- (3) Company telephone number.
- (4) Line of business.
- (5) Chief executive officer/key manager.
- (6) Date the company was started.
- (7) Number of people employed by the company.
- (8) Company affiliation.

(c) Offerors located outside the United States may obtain the location and phone number of the local Dun and Bradstreet Information Services office from the Internet home page at <http://www.customerservice@dnb.com>. If an offeror is unable to locate a local service center, it may send an e-mail to Dun and Bradstreet at globalinfo@mail.dnb.com.

(End of provision)

9 SMALL BUSINESS SIZE STANDARD.

The small business size standard is gross annual receipts for its preceding 3 fiscal years did not exceed \$28.5 million.

10 NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS).

In accordance with Subsector 233 of the NAICS Manual, the work in this solicitation is assigned classification code 23332.

11 (DFARS 252.204-7004) REQUIRED CENTRAL CONTRACTOR REGISTRATION (NOV 2001)

(a) Definitions.

As used in this clause--

(1) "Central Contractor Registration (CCR database" means the primary DoD repository for contractor information required for the conduct of business with DoD.

(2) "Data Universal Numbering System (DUNS) number" means the 9-digit number assigned by Dun and

Bradstreet Information Services to identify unique business entities.

(3) "Data Universal Numbering System +4 (DUNS+4) number" means the DUNS number assigned by Dun and Bradstreet plus a 4-digit suffix that may be assigned by a parent (controlling) business concern. This 4-digit suffix may be assigned at the discretion of the parent business concern for such purposes as identifying subunits or affiliates of the parent business concern.

(4) "Registered in the CCR database" means that all mandatory information, including the DUNS number or the DUNS+4 number, if applicable, and the corresponding Commercial and Government Entity (CAGE) code, is in the CCR database; the DUNS number and the CAGE code have been validated; and all edits have been successfully completed.

(b)(1) By submission of an offer, the offeror acknowledges the requirement that a prospective awardee must be registered in the CCR database prior to award, during performance, and through final payment of any contract resulting from this solicitation, except for awards to foreign vendors for work to be performed outside the United States.

(2) The offeror shall provide its DUNS or, if applicable, its DUNS+4 number with its offer, which will be used by the Contracting Officer to verify that the offeror is registered in the CCR database.

(3) Lack of registration in the CCR database will make an offeror ineligible for award.

(4) DoD has established a goal of registering an applicant in the CCR database within 48 hours after receipt of a complete and accurate application via the Internet. However, registration of an applicant submitting an application through a method other than the Internet may take up to 30 days. Therefore, offerors that are not registered should consider applying for registration immediately upon receipt of this solicitation.

(c) The Contractor is responsible for the accuracy and completeness of the data within the CCR, and for any liability resulting from the Government's reliance on inaccurate or incomplete data. To remain registered in the CCR database after the initial registration, the Contractor is required to confirm on an annual basis that its information in the CCR database is accurate and complete.

(d) Offerors and contractors may obtain information on registration and annual confirmation requirements by calling 1-888-227-2423, or via the Internet at <http://www.ccr.gov>.

(End of clause)

12 (FAR 52.236-28) PREPARATION OF PROPOSALS—CONSTRUCTION (OCT 1997)

(a) Proposals must be (1) submitted on the forms furnished by the Government or on copies of those forms; and (2) manually signed. The person signing a proposal must initial each erasure or change appearing on any proposal form.

(b) The proposal form may require offerors to submit proposed prices for one or more items on various bases, including—

- (1) Lump sum price;
- (2) Alternate prices;
- (3) Units of construction; or
- (4) Any combination of paragraphs (b)(1) through (b)(3) of this provision.

(c) If the solicitation requires submission of a proposal on all items, failure to do so may result in the proposal being rejected without further consideration. If a proposal on all items is not required, offerors should insert the words "no proposal" in the space provided for any item on which no price is submitted.

(d) Alternate proposals will not be considered unless this solicitation authorizes their submission.

(End of provision)

13 (FAR 52.233-2) SERVICE OF PROTEST (AUG 1996).

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgement of receipt from District Counsel, 106 South 15th Street, Omaha, Nebraska 68102-1618.

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

14 (FAR 52.236-27) SITE VISIT (CONSTRUCTION) (FEB 1995).

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be

performed.

(b) A pre-proposal conference and site visit is scheduled for 25 July 2002 at Schriever AFB. Contractors will meet at the Corps of Engineers Resident Office at 9:00 AM. Contractor's interested in attending the pre-proposal conference and site visit shall contact the Resident Engineer (Captain Derosier) and register their company name and provide a driver's license number. The Resident Office is located just south of the main Schriever AFB entrance and west of Enoch and Blue Road. Phone (719) 683-3657, Fax (719) 683-3659.

15 OFFEROR'S QUESTIONS AND COMMENTS.

Questions and/or comments relative to these documents should be submitted via e-mail or mailed to: U.S. Army Corps of Engineers, Omaha District, ATTN: CENWO-CT-M 106 South 15th Street, Omaha, NE 68102-1618. Comments should reach this office no later than 20 calendar days prior to the date set for receiving of proposals, if feasible, in order that changes, if needed, may be added by amendment. E-mail addresses, FAX numbers, items for question and points of contact are listed below. Phone calls with questions should be made between 8:30 a.m. and 3:30 p.m. (Central Standard Time) Monday through Friday.

Note: A courtesy copy of all questions shall be sent to the Contract Specialist (Contractual Matters Point of Contact), the Program Manager and the Specifications Section (Technical Contents Points of Contact), except for Small Business questions. Small Business questions shall go to the Small Business Matters point of contact.

Due to heightened security at Government installations, those offerors who have their proposals hand-delivered* shall contact the "Contract Matters" Point of Contact listed below or (402) 221-4100 prior to delivering to the U. S. Army Corps of Engineer District, Omaha, 106 South 15th Street, Omaha, NE.

On the date specified and for thirty (30 minutes) prior to time specified on Standard Form SF 1442, Page 00010-1, item 13.A, a Contracting representative will be in the lobby to receive proposals. At the time specified on Standard Form SF 1442 Page 00010-1, Item 13.A, it will be announced that receipt of proposals is closed. Official time will be established by time/stamp clock located in the area where proposals are received.

***This instruction shall also apply to those proposals delivered through a delivery or parcel service.**

<u>Items for Question</u>	<u>Points of Contact/ Phone numbers/ FAX Numbers</u>	<u>E-mail Addresses</u>
Contract Matters:	Stephanie Rostermundt	e-mail: stephanie.a.rostermundt@usace.army.mil
Ditribution of CD-Roms: Of the proposal documents (limit One per firm)/ amendments**/ Receipt of Proposals	402-221-4134 (phone) 402-221-4199 (fax)	
Small Business Matters	Hubert Carter: hubert.j.carter@usace.army.mil 402-221-4110 (phone)	
Technical Contents Of Proposal Documents	Michael Armstrong michael.l.armstrong@usace.army.mil 402-221-3981 (phone) 402-221-4828 (fax)	
Specifications Section	Michael Pisci: michael.r.pisci@usace.army.mil 402-221-4413 402-221-3842	
Site Inspection	See Paragraph: SITE INSPECTION, above	

**** - The Government may elect to send a notification that an amendment has been posted to the Government's web address, but is not required to. It shall be the Contractor's, Subcontractor's and Supplier's responsibility to check the Government's web address for amendments.**

15.1 PLAN HOLDER'S LIST.

The CD-Rom will provide a list of plan holders that have registered at the time the CD-Rom was created. It is offeror's responsibility to check for any updates to the plan holder's list, which is available at the

following web address:

<http://ebs-nwo.wes.army.mil/>

16 GENERAL DESCRIPTION OF WORK.

Work includes all work required to design and construct the Medical/Dental Clinic at Schriever AFB Colorado. Work shall be in accordance with Request for Proposal documents issued with this solicitation.

17 PROPOSAL SUBMISSION REQUIREMENTS, INSTRUCTIONS, EVALUATION AND CONTRACT AWARD.

See Section 00110: PROPOSAL INSTRUCTIONS, SUBMISSION REQUIREMENTS AND EVALUATION.

18 SOURCE SELECTION BOARD (SSB).

The Contracting Officer has established a Source Selection Board to conduct an evaluation of each proposal received in response to this Solicitation. The evaluation will be based exclusively on the merits and content of the proposal and any subsequent discussion required. The identities of the SSB personnel are confidential, and any attempt by the proposers to contact these individuals is prohibited.

19 COLORADO SALES AND USE TAX.

Specific exemption from the Colorado Sales and Use Taxes will be granted by the Colorado Tax authorities with respect to all materials used by a prime Contractor or subcontractor and which are built into structures furnished under contract to a Government agency. The Colorado Sales and Use Taxes shall be excluded from the bid prices. Exemption certificates are available to both Contractors and subcontractors provided personal application is made therefor to the Department of Revenue, State of Colorado, State Capitol Annex, Denver, Colorado. The Contractor or subcontractor will be required to submit the date of the contract, the amount of the contract, and the proposed date for completion of the contract. Telephone: (303) 534-1208 (General Information).

19.1 CITY TAXES.

The Municipality of Colorado Springs also has a sales and use tax. The Municipal tax authorities should be

contacted by the bidder to determine applicability of the tax to this project.

REQUIRED CENTRAL CONTRACTOR REGISTRATION (CCR)

Register Now: Don't wait until you submit an offer on a solicitation. You must be registered to receive the contract award. It can often take 30 days for CCR to process your registration information.

Register One of Three Ways:

Internet: <http://www.ccr.gov>

Value Added Network (VAN) for EDI users: Contact your VAN for information. If you need to find a VAN look at http://www.acq.osd.mil/ec/ecip/van_list.htm

FAX or Mail: Call (888)227-2423 or (616)961-4725 to receive a registration package. FAX or mail the completed information to the CCR Assistance Center. It can take up to 30 days to process a faxed or mailed package.

CCR Assistance Center
74 Washington Street North, Suite 7
Battle Creek, MI 49017-3084
FAX: (616)961-7243

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SECTION 00110

PROPOSAL INSTRUCTIONS, SUBMISSION REQUIREMENTS AND EVALUATION

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SECTION 00110

PROPOSAL INSTRUCTIONS, SUBMISSION REQUIREMENTS AND EVALUATION

1. WHO MAY SUBMIT

This solicitation is unrestricted and open to both large and small business participation.

2. GENERAL REQUIREMENTS

In order to effectively and equitably evaluate all proposals, the Contracting Officer must receive information sufficiently detailed to clearly indicate compliance with the proposal submission requirements.

3. SIZE OF PRINTED MATTER SUBMISSIONS

All written portions (other than the organization chart) shall be in 8-1/2" x 11" format.

4. WHERE TO SUBMIT

Offerors shall submit their proposal packages to the USACE Contracting Activity at the address shown in Block 8 of Standard Form 1442.

5. SUBMISSION DEADLINE

Due to heightened security at Government installations, those offerors who have their proposals hand-delivered shall contact Stephanie Rostermundt, Contract Specialist at (402) 221-4134 prior to delivering to the U.S. Army Corps of Engineer District, Omaha, 106 South 15th Street, Omaha, NE 68102-1618.

On the date specified and for thirty (30 minutes) prior to time specified on the Standard Form SF 1442, Page 00010-1, Item 13A, a Contracting Representative will be in the lobby to accept proposals. At the time specified on the Standard Form 1442, Page 00010-1, Item 13.A, it will be announced that receipt of proposals is closed. Official time will be established by the clock located in the area where proposals are received.

6. EVALUATION OF PROPOSALS

a. All proposals and documentation, which have been properly submitted, will be evaluated. Proposals received will be evaluated on the basis of the factors stated in the solicitation to select the responsible offeror whose proposal is most advantageous to the Government. Because of the number of proposals anticipated, uniformity of all proposals is essential to assure fair and accurate evaluation. All proposals must comply with the instructions in the solicitation.

b. All responsible offerors whose proposal has a reasonable chance of being selected will be included in the competitive range.

c. Discussions with owners, contract administrators, or other points of contact, provided by the offeror may affect the evaluation rating given for the factors being evaluated by those discussions.

d. Evaluations will be conducted in accordance with the Tradeoff Process, FAR 15.101-1. Tabs 1 through 8

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will be rated using an adjectival methodology with a narrative assessment and Binder #2 (Price) will be evaluated after consensus scoring Tabs 1-8. Proposal evaluation is an assessment of the proposal and the offeror's ability to perform the resultant contract successfully. Proposals will be evaluated to determine ratings supported by narratives, and to identify strengths, weaknesses, and deficiencies of the proposed approach in each proposal.

e. Evaluation Definitions.

(1) **Strength.** A substantive aspect, attribute, or specific item in the proposal that exceeds the solicitation requirements and enhances the probability of successful contract performance.

(2) **Weakness.** A flaw in the proposal that increases the risk of unsuccessful contract performance. A significant weakness in the proposal is a flaw that appreciably increases the risk.

(3) **Deficiency.** A material failure of a proposal to meet a Government requirement or a combination of significant weaknesses in a proposal that increases the risk of unsuccessful contract performance to an unacceptable level.

(4) **Clarification.** Clarifications are limited exchanges between the Government and offerors that may occur when award without discussions is contemplated. If award without discussions is anticipated, offerors may be given the opportunity to clarify certain aspects of their proposals or to resolve minor or clerical errors.

(5) **Communications.** Communications are exchanges between the Government and offerors after receipt of proposals, leading to establishment of the competitive range.

(6) **Discussions.** Discussions are negotiations conducted in a competitive acquisition and take place after establishment of the competitive range. Discussions are tailored to each offeror's proposal, and shall be conducted by the Contracting Officer with each offeror within the competitive range.

(7) **Rating.** The application of a scale of words, colors, or numbers, used in conjunction with narrative, to denote the degree to which the proposal has met the standard for a non-cost factor. For purposes of this solicitation, ratings will consist of words (adjectival method) used in conjunction with narratives. Ratings will be applied at the factor (tab) and subfactor level. If at any level of indentation an Offeror's proposal is evaluated as not meeting a minimum requirement (that is, below the level of acceptable), this fact must be included in the rating and narrative assessment at that level and each higher level of indentation. Therefore, a marginal or unacceptable rating at any level must be carried to the factor (tab) level. The following ratings will be used to evaluate Tabs 1 through 8:

(a) **Exceptional.** Exceeds requirements of the RFP, provides all required information stated in Section 00110 and is expressed in a manner indicating maximum benefit to the government.

(b) **Above Average.** Exceeds requirements of the RFP, provides all required information stated in Section 00110 and is expressed in a manner indicating significant benefit to the government.

(c) **Average.** Complies with the requirements of the RFP as stated in Section 00110. The government may still receive benefit from the proposal submitted.

(d) **Marginal.** Fails to meet a minimum requirement of the RFP as stated in Section 00110; however, any deficiencies are correctable without a major revision of the proposal.

(e) **Unacceptable.** Fails to meet a minimum requirement of the RFP as stated in Section 00110, and the deficiency is uncorrectable without a major revision of the proposal.

(f) Neutral. No Performance Record Identified. Per Federal Acquisition Regulation (FAR) 15.305(a)(2)(iv), "In the case of an offeror without a record of relevant past performance or for whom information on past performance is not available, the offeror may not be evaluated either favorably or unfavorably on past performance."

7. EVALUATION FACTORS FOR AWARD

The areas to be evaluated include Evaluation Factors, which will be evaluated based on the adjectival method of evaluation. The requirements specified in the solicitation are considered to be minimum requirements. A more favorable evaluation rating may be given for exceeding the minimum requirements.

EVALUATION FACTORS

Binder No. 1

Tab 1 - Design Experience & Tab 2 - Construction Experience (equal)

Tab 3 - Design Personnel & Tab 4 - Construction Personnel (equal)

Tab 5 - Past Performance, Design & Tab 6 - Past Performance, Construction (equal)

Tab 7 - Project Management Plan (PMP)

Tab 8 - Utilization of Small Business Concerns

SUBJECTIVELY EVALUATED FACTORS

Binder No. 2

Price - (approximately equal to the combined tab elements in Binder 1)

Note that the evaluation factors listed above, other than Price, are listed in descending order of importance. A low evaluation rating for any tab, or combination of different tabs, may cause the proposal to be evaluated as unsatisfactory. Binder No. 2, Price will be evaluated in accordance the requirements listed in paragraph 10, EVALUATION OF PRICE.

8. BINDER NOS. 1 AND 2 - PROPOSAL REQUIREMENTS AND SUBMISSION FORMAT

- a. Offerors shall submit the original along with five (5) copies of their proposal; each shall consist of a 3-ring binder with Tabs (dividers) separating each Tab component described herein. Please designate as "Binder No. 1" on the original and copies.

Binder No.1

Tab 1 - Design Experience

Tab 2 - Construction Experience

Tab 3 - Design Personnel

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Tab 4 – Construction Personnel

Tab 5 - Past Performance (Design)

Tab 6 - Past Performance (Construction)

Tab 7 - Project Management Plan (PMP)

Tab 8 - Utilization of Small Business Concerns

- b. Offerors shall submit the original and five (5) copies of their price proposal contained in a 3-ring binder and designated "Binder No. 2".

Binder 2

Single Tab with the Solicitation/Contract Form and Pricing Schedule (Section 00010) and Representations, Certifications and Other Statements of Offerors (Section 00600).

All proposals shall contain the evaluation requirements stated herein and every binder shall also contain: Table of Contents, List of Tables (if required), List of Figures (if required), List of Appendixes, and Name/Address/Telephone Number of the Offeror. Proposal clarity, organization (as requested in this solicitation) and cross referencing is mandatory. No material (information not part of proposal) shall be incorporated by reference. The offeror shall submit in the proposal the requested information specified herein. ***Note: Tabs 1-8 are shown below in descending order of importance, excluding Binder 2 (Price), which is approximately equal to all of the combined tab elements contained in Binder No. 1.***

Tab 1 - Design Experience & Tab 2 - Construction Experience (equal)

Tab 3 - Design Personnel & Tab 4 – Construction Personnel (equal)

Tab 5 - Past Performance, Design & Tab 6 - Past Performance, Construction (equal)

Tab 7 - Project Management Plan (PMP)

Tab 8 - Utilization of Small Business Concerns

Note: If you do not want the data submitted below disclosed by the Government, follow the procedure specified in Section 00100 INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS, paragraph: RESTRICTION ON DISCLOSURE AND USE OF DATA.

8.1. TAB 1 - DESIGN EXPERIENCE

The Design team submitted should demonstrate recent experience in designing Medical/Dental Clinics or projects of similar scope and complexity as this project. Similar scope and complexity include hospitals, health clinics, and facilities with medical and/or dental equipment design and installation. Submit four (4) projects designed by your firm that most clearly illustrates your experience, in designing Medical/Dental Clinics or similar project as defined above. In addition, these projects should demonstrate applicable Military Design experience and Design/Build experience.

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Provide each project example on one or two typed sheets along with picture/photo, also list the designers presented below in Tab 3 "Design Personnel" if they participated in the project example. No more than four (4) projects may be submitted. Submission of fewer than four (4) projects will reduce the proposer's rating in this category. Include a brief scope description for each project. Project examples may include (in descending order of preference):

- USAF Military design/build Medical/Dental Clinics or similar projects designed and constructed.
- Military (Non-USAF) design-build Medical/Dental Clinics or similar projects designed and constructed.
- Non-Military private sector design-build Medical/Dental Clinics or similar projects designed and constructed.
- Military non design-build Medical/Dental Clinics or similar projects designed and constructed.
- Private sector non design-build Medical/Dental Clinics or similar projects designed and constructed.

Projects should be at least \$2,000,000 in construction cost and completed within the past five (5) years of the date that proposals for the Medical/Dental Clinic are due. Project examples may include past experience as a prime design-build agent, or joint venture team, or design agent. If a joint venture has been formed for this contract only, include a brief description of previous experience with the Construction Contractor. **Indefinite-Delivery, Indefinite Quantity (IDIQ) Contracts, where numerous Task Orders are summed to meet the minimum construction dollar value identified herein, are not acceptable.** Additional project example information should include: a description of the designed project/facility; construction contract award amount; final construction cost; location; date when the project was started; original contract finish date and actual finish date. All summaries should contain the name, address, telephone and fax number of a representative of the owner (as well as one alternate individual not affiliated with your firm) familiar with your firm's experience on the project that can verify the experience cited.

8.2. TAB 1 - DESIGN EXPERIENCE (EVALUATION)

The experience of the offeror's design team in the design of Medical/Dental Clinics or similar projects as defined in Paragraph 8.1 will be evaluated. In addition, project examples required by Paragraph 8.1 will be evaluated in the following order for favorable merit: 1) USAF Military design on design-build projects, 2) Military non-USAF design on design-build projects, 3) Private sector design on design-build projects, 4) Military design on non design-build projects, and 5) private sector design on non design-build projects.

8.3. TAB - 2 CONSTRUCTION EXPERIENCE

In this tab, the offeror should submit four (4) project summaries of construction projects which best illustrate his/her experience on Medical/Dental Clinic construction or construction projects of similar scope and complexity as this project. Similar scope and complexity include hospitals, health clinics, and facilities with medical and/or dental equipment construction and installation. Each project summary should consist of a one or two page narrative of the project discussing the project and providing specifics as noted herein. No more than 4 (four) projects may be submitted. However, if four Medical/Dental Clinic construction projects are not included in the proposal, the firm's proposal will be evaluated less favorably than those firms submitting four (4). Each project cited should have a construction dollar value of at least \$2,000,000 and completed within the past five (5) years. **Indefinite-Delivery, Indefinite Quantity (IDIQ) Contracts, where numerous Task Orders are summed to meet the minimum construction dollar value identified herein, are not acceptable.** Only those projects for which the offeror was the prime construction contractor should be submitted. Summaries for each project example submitted should include Medical/Dental Clinics or similar construction projects as defined above that the primes firm has constructed along with

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picture/photo of the each project example. List key construction personnel presented below in Tab 4 “Construction Personnel” if they participated in the project example. No more than four (4) projects may be submitted. Submission of fewer than four (4) projects will reduce the proposer’s rating in this category. Include a brief scope description for each project. Project examples may include (in descending order of importance):

- USAF Military design/build Medical/Dental Clinics or similar projects constructed.
- Military (Non-USAF) design-build Medical/Dental Clinics or similar projects constructed.
- Military, non design-build Medical/Dental Clinics or similar projects constructed.
- Non-Military private sector design-build Medical/Dental Clinics or similar projects constructed.
- Private sector non design-build Medical/Dental Clinics or similar projects constructed.

Construction projects (preferably military design build) should be at least \$2,000,000 in construction cost and completed within the past five (5) years of the date that proposals for the Medical/Dental Clinic are due. Project examples may include past experience as a prime design-build agent, or joint venture team, or prime construction contractor. If a joint venture has been formed for this contract only, include a brief description of previous experience with the Design Agent. Additional project example information should include: a description of the project; construction contract award amount; final construction cost; location; date when the project was started; original contract finish date and actual finish date. All summaries should contain the name, address, telephone and fax number of a representative of the owner (as well as one alternate individual not affiliated with your firm) familiar with your firm’s experience on the project that can verify the experience cited.

8.4. TAB 2 - CONSTRUCTION EXPERIENCE (EVALUATION)

The experience of the offeror's construction team in the construction of Medical/Dental Clinics or similar projects as defined in Paragraph 8.3 will be evaluated. In addition, project examples required by Paragraph 8.3 will be evaluated in the following order for favorable merit: 1) USAF Military design-build construction, 2) Military non-USAF design-build construction, 3) Military non design-build construction, 4) Private sector design-build construction and 5) private sector non design-build construction.

8.5. TAB 3 - DESIGN PERSONNEL

Submit one or two page resumes of lead and support design personnel, for categories listed below, who will work on this project. The design team should be composed of project managers, registered architects and engineers, or a multi-discipline design firm with project managers, registered architects and engineers on staff providing complete facility design services. Project Managers and lead designers should be registered professional architects or engineers (preferably registered in the state of Colorado) with at least 5 years experience as a registered professional in the design of similar projects. Include examples of constructed projects the Project Manager and lead designers/design team have worked on together. Project examples may include (in descending order of importance):

- Design on USAF Military design/build Medical/Dental Clinics or similar projects designed and constructed.
- Design on Military (Non-USAF) design-build Medical/Dental Clinics or similar projects designed and constructed.
- Design on Non-Military private sector design-build Medical/Dental Clinics or similar projects designed and

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constructed.

- Design on Military, non design-build Medical/Dental Clinics or similar projects designed and constructed.
- Design on private sector non design-build Medical/Dental Clinics or similar projects designed and constructed.

Projects should be at least \$2,000,000 in construction cost and completed within the past 5 years of the date that proposals for the Medical/Dental Clinic are due. The design team should include the following disciplines:

- Project Manager (Registered Architect or Engineer)
- Registered Architect
- Registered Structural Engineer with training related to the 1997 National Earthquake Hazard Reduction Program (NEHRP)
- Registered Mechanical Engineer
- Registered Electrical Engineer
- Registered Fire Protection Engineer
- Registered Civil Engineer
- Registered Landscape Architect
- Interior Designer - Certified by the National Council of Interior Designers Qualifications (NCIDQ)
- Certified Corrosion Engineer

If, because of reasons beyond the control of the design team, the named individuals are not able to fulfill this obligation, replacement personnel with similar education and experience shall be presented for acceptance by the Contracting Officer.

Resumes for each designer shall have associated dates for their submitted experience. In addition, submit a company resume and include your past experience as a prime design/build agent, joint venturer, or for joint ventures formed for this contract only, design agent experience in comparable projects. Include an Organizational Chart indicating all design team members proposed under Tab 3.

8.6. TAB 3 – DESIGN PERSONNEL (EVALUATION)

Qualifications of key design personnel assigned to this project (experience, professional registration and education as important factors) will be evaluated. Lead personnel will be evaluated more favorably for relatable military design-build project experience. In descending order of importance, more favorable ratings are given to 1) USAF design-build, 2) other Military branch design-build, 3) non-military design-build 4) military design experience (non design-build), and 4) non-military (non design-build) design experience.). More favorable ratings are awarded if lead personnel are registered in the state of Colorado. More favorable ratings are awarded for projects where personnel have previous experience with other members of the design team (i.e. Team members participating together on projects submitted under Tab 1. In addition, more favorable ratings are given for design teams with design personnel employed by one complete design firm (i.e., Project Manager, Architect, Structural, Civil, Mechanical, Electrical, etc., are all under the same company banner).

8.7. TAB 4 - CONSTRUCTION PERSONNEL

In this tab, the proposer should present the names and resumes for key construction personnel that will be assigned to this project. In addition, provide a summary of the duties and responsibilities of these individuals, which clearly indicate separate duties and responsibilities for each individual. As a minimum, this tab should include data on the

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following personnel:

- a. Project Manager
- b. Project Superintendent
- c. CQC System Manager

The proposal should clearly present the credentials of each person, and shall show that each meets the requirements listed below. Resumes should include examples of project experience (including what capacity the individual served on each project), as well as the **dates (beginning and ending)** employed on each project, and the monetary size of each project cited as experience. In addition, the educational qualifications of the proposed personnel shall be submitted. Prior experience on military construction projects is preferred and will be evaluated more favorably.

In addition, more favorable evaluations ratings will be given for longevity of experience at the position being proposed and education. If because of reasons beyond the control of the construction firm, the individuals named in this proposal are not able to be utilized on this project, replacement personnel with similar skills and experience shall be presented for acceptance and approval by the Contracting Officer. Replacement individuals for this project shall be required to have qualifications and experience meeting or exceeding those identified in the proposal.

Project Manager: The Project Manager shall be a registered engineer, registered architect or graduate construction manager and should have at least 5 years experience as a Project Manager on projects similar to this Medical/Dental Clinic.

Project Superintendent: The Project Superintendent shall be a graduate engineer or experienced construction person and should have at least 5 years experience as a Project Superintendent on projects similar to this Medical/Dental Clinic.

Contractor Quality Control (CQC) System Manager: The Contractor Quality Control System (CQC) Manager shall be a graduate engineer or experienced construction person with a minimum of 5 years experience as a CQC System Manager on projects similar to this Medical/Dental Clinic.

8.8. TAB 4 - CONSTRUCTION PERSONNEL (EVALUATION)

Qualifications of key construction personnel assigned to this project will be considered. More favorable evaluation ratings will be given for military construction project experience, longevity of experience at the position being proposed and education.

8.9. TAB 5 - PAST PERFORMANCE, DESIGN

If available, the Offeror should submit **all** Architect-Engineer Contract Administration Support System (ACASS) Performance Evaluations received on DOD government projects over the last 5 years. Any past performance, design in the last 5 years the Offeror wishes to submit outside ACASS shall be submitted on the attached Past Performance Summary Sheet (Design) and must be completed by an owner or owner's representative and included in the proposal. In the event the Offeror has no past performance (design) information, a neutral rating will be provided. ***Note: For each private sector project submitted (outside ACASS) as a summary in paragraph 8.1 above, the Offeror shall provide a completed Performance Summary Sheet (Design) for that project.*** A blank copy of the Performance Summary Sheet (Design) is attached to this section.

Copies of records contained in the Corps of Engineers ACASS Database may be requested by fax on company

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letterhead at the following telefax number: (503) 808-4596. For performance evaluation on DOD or non-DOD government projects, the Government reserves the right to contact the evaluator to verify your firm's construction experience.

8.10. TAB 5 - PAST PERFORMANCE, DESIGN (EVALUATION)

The following items will be evaluated:

Design ACASS Ratings

Performance Summary Ratings (Design)

Past Performance ratings received on prior DOD government work will be evaluated along with private sector Performance Summary Sheets (one required for each Private Industry project used as an example for "TAB 1 - Design Experience" portion of this proposal). Higher ratings will be evaluated more favorably than lower ratings. If an offeror has no past performance evaluations within the ACASS database or Performance Summary Sheets (Design) included in the proposal, a neutral evaluation will be awarded.

Higher ratings will be given for ACASS Ratings similar to those found in the Performance Summary (Design) Ratings (e.g., an "Above Average" ACASS rating will be evaluated more favorably than an "Above Average" rating from a Performance Summary Sheet). The Government may contact the raters for either the ACASS Rating or the Performance Summary Sheets. Furthermore, the government reserves the right to verify the ACASS ratings provided, as well as research the ACASS database for other ratings not provided in the proposal documents. Information furnished for each project and information received from references will affect the evaluation rating awarded.

8.11. TAB 6 - PAST PERFORMANCE, CONSTRUCTION

If available, the Offeror should submit all Construction Contractor Appraisal Support System (CCASS) Performance Evaluations (Construction) received on DOD government projects over the last 5 years. Any past performance, design in the last 5 years the Offeror wishes to submit outside CCASS shall be submitted on the attached Past Performance Summary Sheet (Construction) and must be completed by an owner or owner's representative and included in the proposal. In the event the Offeror has no past performance (construction) information, a neutral rating will be provided. ***Note: For each private sector project (outside CCASS) submitted as a summary in paragraph 8.2 above, the Offeror shall provide a completed Performance Summary Sheet (Construction) for that project.***

Copies of records contained in the Corps of Engineers CCASS Database may be requested by fax on company letterhead at the following telefax number: (503) 808-4596. For performance evaluation on DOD or non-DOD government projects, the Government reserves the right to contact the evaluator to verify your firm's construction experience. A blank copy of the Performance Summary Sheet (Construction) is attached to this section.

8.12. TAB 6 - PAST PERFORMANCE, CONSTRUCTION (EVALUATION)

The following items will be evaluated:

Construction CCASS Ratings

Performance Summary Ratings

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Past Performance ratings received on prior DOD government work and Performance Summary Sheets (one required for each Private Industry project used as an example for "TAB 2- Construction Experience" portion of this proposal) will be evaluated. Higher evaluation ratings will be awarded for Outstanding evaluations. In descending order, lower ratings will be given for past evaluations of Above Average, Satisfactory (Average), Marginal, and Unsatisfactory (Unacceptable). If an offeror has no past performance evaluations within the CCASS database or Performance Summary Sheets (Construction) included in the proposal, a neutral evaluation will be awarded.

The Past Performance rating received on all CCASS ratings for the last five years, as well as all ratings received on the Performance Summary Sheets will be evaluated. Higher ratings will be given for CCASS Ratings similar to those found in the Performance Summary (Construction) Ratings (e.g., an "Above-Average" CCASS rating will be evaluated more favorably than an "Above-Average" rating from a Performance Summary Sheet). The Government may contact the raters for either the CCASS Rating or the Performance Summary Sheets. Furthermore, the government reserves the right to verify the CCASS ratings provided, as well as research the CCASS database for other ratings not provided in the proposal documents. Information furnished for each project and information received from references will affect the evaluation rating awarded.

8.13. TAB 7 - PROJECT MANAGEMENT PLAN (PMP)

This tab shall include a comprehensive PMP developed specifically for this project. The information in the PMP should make it clear that the offeror has the ability to deliver a quality product and effectively manage the design and construction team, as well as the ability to coordinate all work throughout the design and construction phases. The PMP shall include an explanation of the total project team management approach for both the design team and the construction team. It shall include: management of firms included within the design team and construction team, specific quality control procedures used (including Quality Control procedures to be used to limit re-submittals, design errors, and poor coordination between the prime design firm and design consultant), schedule development, and address internal methods and safeguards for adherence of schedule. In addition, it should address the acquisition of environmental permits in a timely fashion, safety, preparation and submission of As-Built documents, and contract close-out. It should discuss how the design team will support the Contractor during construction and an organizational chart showing the inter-relationship of management and various team components. In addition, the PMP should address the relationship between designer and construction contractor and should clearly indicate an understanding of the design-build process. An organizational chart shall be included and it may be a foldout.

8.14. TAB 7 - PROJECT MANAGEMENT PLAN (PMP) (EVALUATION)

The quality of the offeror's plan to deliver a quality product and effectively manage the construction team and ability to effectively coordinate all work throughout the design and construction phase of this project will be evaluated. The information in the PMP should make it clear that the offeror has the ability to effectively manage the designers, consultants and subcontractors on the team, as well as the ability to coordinate all work throughout the design and construction phases. The PMP shall include an explanation of the total project team management approach for both the design team and the construction team. It shall include: management of firms included within the design team and construction team, specific quality control procedures used (including Quality Control procedures to be used to limit re-submittals, design errors, and poor coordination between the prime design firm and design consultant), schedule development, and methods to be utilized to adhere to the schedule. In addition, it should address the acquisition of environmental permits in a timely fashion, safety, preparation and submission of As-Built documents, and contract close-out. It should discuss how the design team will support the Contractor during construction and an organizational chart showing the inter-relationship of management and various team components. In addition, the PMP should address the relationship between designer and construction contractor and should clearly indicate an understanding of the design-build process. Higher evaluation ratings can be achieved with a thoroughly explained

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Project Management Plan suitable for the scope and complexity of this project, and which addresses each of the following:

- Management Approach
- Sub-Contractor Management
- Quality Control Procedures
- Schedule development and adherence
- Organization Chart
- Acquisition of Environmental Permits
- Safety
- Preparation and submission of As-Built documents
- Contract close-out

8.15. TAB 8 - UTILIZATION OF SMALL BUSINESS CONCERNS

If the contractor is a Small Business Concern, a single sheet stating that the contractor is a Small Business Concern, in lieu of completing the information requested for Tab 8, is sufficient. The Offeror (other than a SB concern) shall demonstrate how the firm plans to identify, commit and utilize Small Business (**SB**), Small Disadvantaged Business (**SDB**), HUBZone Small Business, Women-owned Small Business (**WOSB**) concerns, Severely Disabled Veterans (**SDV**), and Historical Black Colleges and Minority Institutions (**HBCU/MI**) as team members, subcontractors and/or suppliers in the performance of the resultant contract of this solicitation. It is the policy of the U.S. Army Corps of Engineers, Omaha District (CENWO) that small business concerns have the maximum practicable opportunity to participate in performing contracts let by the Contracting Activity (CENWO-CT). It is further the policy of the CENWO that its large-business prime contractors demonstrate the extent they plan to utilize small business concerns in any resultant contract and provide assurance in its offer that small business concerns will have maximum subcontracting opportunities in its prime contracts.

8.15.1. Definitions

a. Small Business Concerns. For the purpose of this section, small business concerns refer to Small Business, Small Disadvantaged Business, Women-owned Small Business, HUBZone Small Business, Severely Disabled Veterans (SDV), Historically Black College and University and Minority Institutions.

b. Prime Contractor. For the purpose of this section, a prime contractor refers to both large and small contractors.

c. Offeror: For the purpose of this section, offeror refers to both large and small contractors.

d. Floor: "Floor" is the term the U.S. Army Corps of Engineers use to replace goal. It represents the minimum level for small business performance.

The Offeror's proposal should demonstrate the utilization and participation of small business concerns. The proposal should clearly state factors that demonstrate a strong commitment to use small business concerns. Enforceable commitments to use small business concerns will be weighed more heavily than non-enforceable ones. The evaluation of utilization and participation of small business concerns is separate and distinct from the requirement at Federal Acquisition Regulation (FAR) Clause 52.219-9, Small Business Subcontracting Plan.

8.15.2. Tab Contents

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This tab, as a minimum, should include:

- a. Development of percentage floors based on planned subcontracting which is challenging yet realistic. The following floors are considered reasonable and obtainable for requirements awarded in Fiscal Year 2002.
 - (i) 61.4% of planned subcontracting dollars to be placed with all small business concerns.
 - (ii) 9.1% of planned subcontracting dollars to be placed with those small business concerns owned and controlled by socially and economically disadvantaged individuals.
 - (iii) 5.0% of planned subcontracting dollars to be placed with women-owned small business concerns.
 - (iv) 3.0% of planned subcontracting dollars with Severely Disabled Veterans Small Business concerns.
 - (v) 2.5% of planned subcontracting dollars with Hubzones Small Business Concerns.
 - (vi) 10% of planned subcontracting dollars with HBCU/MI Small Business Concerns.
- b. Past Performance in Meeting Small Business Floors. Demonstrate how floors for SB, SDB and WOSB participation were satisfied on previous contracts. Extent to which the prime has historically been successful in establishing realistic yet challenging goals and evidences ability to achieve them. The Offeror should submit data on Past Performance in meeting small business goals which will demonstrate how goals for small business concerns participation on previous contracts was satisfied. The data to be provided should include: (1) Client/Customer (2) Contract/Identification Number (3)Project Description (4) Contract Amount (5) Reference or Point of Contract (to include address and telephone number).
- c. Demonstrate utilization and participation of small business concerns, clearly stated factors that demonstrate strong commitments to use SB, SDB, WOSB, SDV, and HBCU/MI as team members, subcontractors, and/or suppliers.
- d. Description of supplies and services to be subcontracted and planned for subcontracting to SBs, SDBs, WOSBs, SDVs, and HBCUs/MIs.
- e. Assurances that the offeror will include the clause at FAR 52.219-8, Utilization of Small Business Concerns in all subcontracts that offer further subcontracting opportunities, and that the offeror will require subcontractor (including small business concerns) that receive subcontracts in excess of \$500,000 (\$1,000,000 for construction) to adopt a small business participation program similar to the requirements of the resultant contract.

8.16. TAB 8 - UTILIZATION OF SMALL BUSINESS CONCERNS (EVALUATION)

See paragraph 8.15.2 for areas of evaluation.

The apparent successful offeror will be required to submit an acceptable subcontracting plan in accordance with FAR Clause 52.219.9, Small Business Subcontracting Plan. FAR Clause 52.219.9 is not applicable to small business concerns. If the apparent successful offeror fails to negotiate a subcontracting plan acceptable to the Contracting Officer within the time limit prescribed by Contracting Officer, the apparent successful offeror will be ineligible for award.

9. BINDER NO. 2 - PRICE (IN THIS BINDER, THE OFFEROR SHALL SUBMIT THE INFORMATION SPECIFIED HEREIN)

- a. Section 00010, Solicitation/Contract Form and Pricing Schedule.** The total cost for the design and construction will be considered for evaluation. Proposed price will be utilized in the establishment of the competitive range.
- b. Section 00600, Representations, Certifications and Other Statements of Offerors.** This item is not considered for evaluation, but is a required item.

10. EVALUATION OF BINDER NO. 2, PRICE

Price will be subjectively evaluated by the Government considering:

(a) Best Value: The expected outcome of an acquisition, that, in the Government's estimation, provides the greatest overall benefit in response to the requirement.

(b) Realism: Costs in an offeror's proposal are realistic for the work to be performed, reflect a clear understanding of the requirements, and are consistent with the various elements of the offeror's technical proposal.

Note that all evaluation factors other than Price, when combined, are approximately equal to the Price evaluation.

11. COMPETITIVE RANGE

Upon completion of proposal evaluation, the Government may determine a competitive range for the purpose of conducting written discussion. The competitive range shall be determined on the basis of the factors stated in the solicitation and shall include all proposals that have a reasonable chance of being selected for award. The Government intends to award a contract on the basis of initial offers received, without discussions. Therefore, each initial offer should contain the offeror's best terms from a cost or price and technical standpoint. Notwithstanding, the Government may conduct written or oral discussion with all responsible offerors who submit proposals within the competitive range. Offerors submitting proposals determined outside of the competitive range (lacking a reasonable chance of being selected for contract award) will be notified in writing at the earliest practicable time.

In accordance with Federal Acquisition Regulation (FAR) 15.505 and 15.506, the offeror may request a preaward or postaward debriefing in writing to the Contracting Officer within three days, in accordance with clause: "SERVICE OF PROTEST", of Section 00100 INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS.

12. FINAL PROPOSAL REVISIONS

If discussions are held, upon completion of discussions, the Government shall issue to all Offerors still within the competitive range a request for final proposal revisions. Following the evaluation of final proposal revisions, the Government will select the source whose final proposal revision is most advantageous, considering only the factors included in the solicitation.

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PERFORMANCE SUMMARY SHEET (CONSTRUCTION)

SOLICITATION NUMBER DACA45-02-R-0040

Contractor's Name: _____

Project Name: _____

Project Location: _____

Name & Title of Person Completing this Summary _____

Name of Firm of Person Completing this Summary: _____

Signature of Person Completing this Summary: _____

Date: _____ Phone Number: _____

1. Overall Rating of this Contractor:

- ____ Exceptional
- ____ Above Average
- ____ Average
- ____ Marginal
- ____ Unacceptable

2. Cost Growth:

Original Construction Contract Award Amount: _____

Final Construction Contract Amount: _____

In your opinion, which of the following statement best describes your experience with cost growth on this project:

- ____ a. The contractor did not contribute to any cost growth.
- ____ b. The contractor contributed to some degree to the cost growth experienced on this project.
- ____ c. The contractor contributed significantly to the cost growth experienced on this project.

Any additional cost growth comments:

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PERFORMANCE SUMMARY SHEET Construction (Part 2)

SOLICITATION NUMBER DACA45-02-R-0040

3. Time Growth:

Original Contract Completion Date: _____

Final Contract Completion Date: _____

In your opinion, which of the following statement best describes your experience with time growth on this project:

- _____ a. The contractor did not contribute to any time growth.
- _____ b. The contractor contributed to some degree to the time growth experienced on this project.
- _____ c. The contractor contributed significantly to the time growth experienced on this project.

Any additional time growth comments:

4. Quality: Which of the following statements most accurately describe the quality of the work the contractor provided on your project:

- _____ a. The work provided by the contractor was of high quality.
- _____ b. The work provided by the contractor was of fair quality.
- _____ c. The work provided by the contractor was of poor quality.

Any additional comments on quality:

5. The willingness of past customers to have a contractor perform more work for them is an indication of overall satisfaction with the contractor's performance. If you were to construct another project similar to the one recently completed, and you had the responsibility and total authority to select the contractor for the new project, which of the following statements most accurately depicts the approach you would take?

- _____ a. I would have this contractor construct the new project.
- _____ b. I would consider this contractor, but I would also explore the possibility of using other contractors to construct the project.
- _____ c. I would not consider using this contractor to construct the new project.

6. Any additional comments (additional sheets may be added, if necessary):

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PERFORMANCE SUMMARY SHEET (DESIGN)

SOLICITATION NUMBER DACA45-02-R-0040

Designer's Name: _____

Project Name: _____

Project Location: _____

Name & Title of Person Completing this Summary _____

Name of Firm of Person Completing this Summary: _____

Signature of Person Completing this Summary: _____

Date: _____ Phone Number: _____

1. Overall Rating of this Designer:

____ Exceptional

____ Above Average

____ Average

____ Marginal

____ Unacceptable

2. Cost Growth:

In your opinion, which of the following statement best describes your experience with cost growth on this project:

____ a. The designer did not contribute to any cost growth.

____ b. The designer contributed somewhat to the cost growth experienced on this project.

____ c. The designer contributed significantly to the cost growth experienced on this project.

Any additional cost growth comments:

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PERFORMANCE SUMMARY SHEET Designers (Part 2)

SOLICITATION NUMBER DACA45-02-R-0040

3. Time Growth:

In your opinion, which of the following statement best describes your experience with time growth on this project:

- ☐ a. The designer did not contribute to any time growth.
- ☐ b. The designer contributed somewhat to the time growth experienced on this project.
- ☐ c. The designer contributed significantly to the time growth experienced on this project.

Any additional time growth comments:

4. Quality: Which of the following statements most accurately describe the quality of the work the designer provided on your project:

- ☐ a. The work provided by the designer was of high quality.
- ☐ b. The work provided by the designer was of fair quality.
- ☐ c. The work provided by the designer was of poor quality.

Any additional comments on quality:

5. The willingness of past customers to have a designer perform more work for them is an indication of overall satisfaction with the designer's performance. If you were to design/construct another project similar to the one recently completed, and you had the responsibility and total authority to select the designer for the new project, which of the following statements most accurately depicts the approach you would take?

- ☐ a. I would have this designer involved in the new project.
- ☐ b. I would consider this designer, but I would also explore the possibility of using other designers on this project.
- ☐ c. I would not consider using this designer on the new project.

6. Any additional comments (additional sheets may be added, if necessary):

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SECTION 00600
REPRESENTATIONS, CERTIFICATIONS & OTHER STATEMENTS OF OFFERORS

INDEX

1. (FAR 52.203-2) CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985).
2. (FAR 52.203-11) CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (APR 1991).
3. (FAR 52.204-3) TAXPAYER IDENTIFICATION (OCT 1998).
4. (FAR 52.204-5) WOMEN-OWNED BUSINESS (OTHER THAN SMALL BUSINESS)[MAY 1999]
5. (DFARS 252.204-7001) COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE REPORTING (AUG 1999).
6. (FAR 52.209-5) CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (DEC 2001).
7. (DFARS 252.209-7001) DISCLOSURE OF OWNERSHIP OR CONTROL BY A FOREIGN GOVERNMENT THAT SUPPORTS TERRORISM (MAR 1998). [For Contracts exceeding \$100,000]
8. RESERVED
9. (FAR 52.219-1) SMALL BUSINESS PROGRAM REPRESENTATIONS (APR 2002) ALTERNATE I (APR 2002)
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SECTION 00600
REPRESENTATIONS, CERTIFICATIONS & OTHER STATEMENTS OF OFFERORS

The bidder (offeror) makes the following certification and representations as a part of the proposal, shall check the appropriate boxes, fill in the appropriate information, and provide signatures on the attached "Solicitation Form" (00600) pages, and submit with Standard Form 1442 (Section 00010).

1. (FAR 52.203-2) CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985).

(a) The offeror certifies that -

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to (i) those prices, (ii) the intention to submit an offer, or (iii) the methods or factors used to calculate the prices offered;

(2) the prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a Sealed Bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) no attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory -

(1) is the person in the offeror's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above; or

(2)(i) has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above _____

_____ [insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the offeror's organization];

(ii) as an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) as an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the offeror deletes or modifies subparagraph (a)(2) above, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

2. (FAR 52.203-11) CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (APR 1991).

(a) The definitions and prohibitions contained in the clause, at FAR 52.203-12, Limitation on Payments to Influence Certain Federal Transactions, included in this solicitation, are hereby incorporated by reference in paragraph (b) of this certification.

(b) The offeror, by signing its offer, hereby certifies to the best of his or her knowledge and belief that on or after December 23, 1989, -

(1) No Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan, or cooperative agreement;

(2) If any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with this solicitation, the offeror shall complete and submit, with its offer, OMB standard form LLL, Disclosure of Lobbying Activities, to the Contracting Officer; and

(3) He or she will include the language of this certification in all subcontract awards at any tier and require that all recipients of subcontract awards in excess of \$100,000 shall certify and disclose accordingly.

(c) Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by section 1352, title 31, United States Code. Any person who makes an expenditure prohibited under this provision or who fails to file or amend the disclosure form to be filed or amended by this provision, shall be subject to a civil penalty of not less than \$10,000, and not more than \$100,000, for each such failure.

3. (FAR 52.204-3) TAXPAYER IDENTIFICATION (OCT 1998).

(a) Definitions.

"Common parent," as used in this provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

"Taxpayer Identification Number (TIN)," as used in this provision, means the number required by the Internal Revenue Service (IRS) to be used by the offeror in reporting income tax and other returns. The TIN may be either a Social Security Number or an Employer Identification Number.

(b) All offerors must submit the information required in paragraphs (d) through (f) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M, and implementing regulations issued by the IRS. If the resulting contract is subject to the payment reporting requirements described in Federal Acquisition Regulation (FAR) 4.904, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) The TIN may be used by the Government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.

(d) Taxpayer Identification Number (TIN).

[] TIN: _____.

☐ TIN has been applied for.

☐ TIN is not required because:

☐ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

☐ Offeror is an agency or instrumentality of a foreign government;

☐ Offeror is an agency or instrumentality of the Federal Government.

(e) Type of organization.

☐ Sole proprietorship;

☐ Partnership;

☐ Corporate entity (not tax-exempt);

☐ Corporate entity (tax-exempt);

☐ Government entity (Federal, State, or local);

☐ Foreign government;

☐ International organization per 26 CFR 1.6049-4;

☐ Other _____.

(f) Common parent.

☐ Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this provision.

☐ Name and TIN of common parent:

Name _____

TIN _____

(End of provision)

4. (FAR 52.204-5) WOMEN-OWNED BUSINESS (OTHER THAN SMALL BUSINESS)[MAY 1999]

(a) *Definition.* Women-owned business concern, as used in this provision, means a concern that is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

(b) *Representation.* [Complete only if the offeror is a women-owned business concern and has not represented itself as a small business concern in paragraph (b)(1) of FAR 52.219-1, Small Business Program Representations, of this solicitation.] The offeror represents that it ☐ is a women-owned business concern.

(End of provision)

5. (DFARS 252.204-7001) COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE REPORTING (AUG 1999).

(a) The offeror is requested to enter its CAGE code on its offer in the block with its name and address. The CAGE code entered must be for that name and address. Enter "CAGE" before the number.

(b) If the Offeror does not have a CAGE code, it may ask the Contracting Officer to request one from the Defense Logistics Information Service (DLIS). The Contracting Officer will-

- (1) Ask the Contractor to complete section B of a DD Form 2051, Request for Assignment of a Commercial and Government Entity (CAGE) Code;
- (2) Complete section A and forward the form to DLIS; and
- (3) Notify the Contractor of its assigned CAGE code.

(c) Do not delay submission of the offer pending receipt of a CAGE code.

6. (FAR 52.209-5) CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (DEC 2001).

(a)(1) The Offeror certifies, to the best of its knowledge and belief, that—

(i) The Offeror and/or any of its Principals—

(A) Are ☐ are not ☐ presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have ☐ have not ☐, within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

(C) Are ☐ are not ☐ presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision.

(ii) The Offeror has ☐ has not ☐, within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

This Certification Concerns a Matter Within the Jurisdiction of an Agency of the United States and the Making of a False, Fictitious, or Fraudulent Certification May Render the Maker Subject to Prosecution Under Section 1001, Title 18, United States Code.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and

information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default. (End of Provision)

7. (DFARS 252.209-7001) DISCLOSURE OF OWNERSHIP OR CONTROL BY A FOREIGN GOVERNMENT THAT SUPPORTS TERRORISM (MAR 1998). [For Contracts exceeding \$100,000]

(a) Definitions.

As used in this provision-

(1) "Government of a terrorist country" includes the state and the government of a terrorist country, as well as any political subdivision, agency, or instrumentality thereof.

(2) "Terrorist country" means a country determined by the Secretary of State, under section 6(j)(1)(A)) of the Export Administration Act of 1979 (50 U.S.C. App. 2405(j)(i)(A)), to be a country the government of which has repeatedly provided support for acts of international terrorism. As of the date of this provision, terrorist countries include: Cuba, Iran, Iraq, Libya, North Korea, Sudan, and Syria.

(3) "Significant interest" means-

(i) Ownership of or beneficial interest in 5 percent or more of the firm's or subsidiary's securities. Beneficial interest includes holding 5 percent or more of any class of the firm's securities in "nominee shares," "street names," or some other method of holding securities that does not disclose the beneficial owner;

(ii) Holding a management position in the firm, such as a director or officer;

(iii) Ability to control or influence the election, appointment, or tenure of directors or officers in the firm;

(iv) Ownership of 10 percent or more of the assets of a firm such as equipment, buildings, real estate, or other tangible assets of the firm; or

(v) Holding 50 percent or more of the indebtedness of a firm.

(b) Prohibition on award. In accordance with 10 U.S.C. 2327, no contract may be awarded to a firm or a subsidiary of a firm if the government of a terrorist country has a significant interest in the firm or subsidiary [or, in the case of a subsidiary, the firm that owns the subsidiary], unless a waiver is granted by the Secretary of Defense.

(c) Disclosure.

The Offeror shall disclose any significant interest the government of each of the following countries has in the Offeror or a subsidiary of the Offeror. If the Offeror is a subsidiary, it shall also disclose any significant interest the government of a terrorist country has in any firm that owns or controls the subsidiary. The disclosure shall include--

(1) Identification of each government holding a significant interest; and

(2) A description of the significant interest held by each Government.

(End of provision)

8. RESERVED

9. (FAR 52.219-1) SMALL BUSINESS PROGRAM REPRESENTATIONS (APR 2002) ALTERNATE I (APR 2002)

(a)(1) The North American Industry Classification System (NAICS) code for this acquisition is 23332.

(2) The small business size standard is \$28.5 million.

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b) *Representations.* (1) The offeror represents as part of its offer that it ☐ is, ☐ is not a small business concern.

(2) *[Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.]* The offeror represents, for general statistical purposes, that it ☐ is, ☐ is not, a small disadvantaged business concern as defined in 13 CFR 124.1002.

(3) *[Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.]* The offeror represents as part of its offer that it ☐ is, ☐ is not a women-owned small business concern.

(4) *[Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.]* The offeror represents as part of its offer that it ☐ is, ☐ is not a veteran-owned small business concern.

(5) *[Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (b)(4) of this provision.]* The offeror represents as part of its offer that it ☐ is, ☐ is not a service-disabled veteran-owned small business concern.

(6) *[Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.]* The offeror represents, as part of its offer, that—

(i) It ☐ is, ☐ is not a HUBZone small business concern listed, on the date of this representation, on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration, and no material change in ownership and control, principal office, or HUBZone employee percentage has occurred since it was certified by the Small Business Administration in accordance with 13 CFR part 126; and

(ii) It ☐ is, ☐ is not a joint venture that complies with the requirements of 13 CFR part 126, and the representation in paragraph (b)(6)(i) of this provision is accurate for the HUBZone small business concern or concerns that are participating in the joint venture. *[The offeror shall enter the name or names of the HUBZone small business concern or concerns that are participating in the joint venture: _____.]* Each HUBZone small business concern participating in the joint venture shall submit a separate signed copy of the HUBZone representation.

(7) *[Complete if offeror represented itself as disadvantaged in paragraph (b)(2) of this provision.]* The offeror shall check the category in which its ownership falls:

☐ Black American.

☐ Hispanic American.

☐ Native American (American Indians, Eskimos, Aleuts, or Native Hawaiians).

☐ Asian-Pacific American (persons with origins from Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Japan, China, Taiwan, Laos, Cambodia (Kampuchea), Vietnam, Korea, The Philippines, U.S. Trust Territory of the Pacific Islands (Republic of Palau), Republic of the Marshall Islands, Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, Guam, Samoa, Macao, Hong Kong, Fiji, Tonga, Kiribati, Tuvalu, or Nauru).

☐ Subcontinent Asian (Asian-Indian) American (persons with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands, or Nepal).

☐ Individual/concern, other than one of the preceding.

(c) *Definitions.* As used in this provision—

“Service-disabled veteran-owned small business concern”—

(1) Means a small business concern—

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or

permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service connected, as defined in 38 U.S.C. 101(16).

“Small business concern” means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR part 121 and the size standard in paragraph (a) of this provision.

“Veteran-owned small business concern” means a small business concern—

(1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

“Women-owned small business concern” means a small business concern—

(1) That is at least 51 percent owned by one or more women; or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

(d) *Notice.* (1) If this solicitation is for supplies and has been set aside, in whole or in part, for small business concerns, then the clause in this solicitation providing notice of the set-aside contains restrictions on the source of the end items to be furnished.

(2) Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small, HUBZone small, small disadvantaged, or women-owned small business concern in order to obtain a contract to be awarded under the preference programs established pursuant to section 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall—

(i) Be punished by imposition of fine, imprisonment, or both;

(ii) Be subject to administrative remedies, including suspension and debarment; and

(iii) Be ineligible for participation in programs conducted under the authority of the Act.

(End of provision)

10. RESERVED

11. (FARS 52.219-19) SMALL BUSINESS CONCERN REPRESENTATION FOR THE SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM (OCT 2000).

(a) *Definition.* “Emerging small business” as used in this solicitation, means a small business concern whose size is no greater than 50 percent of the numerical size standard applicable to the North American Industry Classification System (NAICS) code assigned to a contracting opportunity.

(b) (Complete only if Offeror has represented itself under the provision at FAR 52.219-1 as a small business concern under the size standards of this solicitation.) The Offeror [] is, [] is not an emerging small business.

(c) (Complete only if the Offeror is a small business or an emerging small business, indicating its size range.)

Offeror's number of employees for the past 12 months (check this column if size standard stated in solicitation is expressed in terms of number of employees) or Offeror's average annual gross revenue for the last 3

fiscal years (check this column if size standard stated in solicitation is expressed in terms of annual receipts).
(Check one of the following.)

No. of Employees	Average Annual Gross Revenues
____ 50 or fewer	____ \$1 million or less
____ 51 - 100	____ \$1,000,001 - \$2 million
____ 101 - 250	____ \$2,000,001 - \$3.5 million
____ 251 - 500	____ \$3,500,001 - \$5 million
____ 501 - 750	____ \$5,000,001 - \$10 million
____ 751 - 1,000	____ \$10,000,001 - \$17 million
____ Over 1,000	____ Over \$17 million

12. (FARS 52.219-21) SMALL BUSINESS SIZE REPRESENTATION FOR TARGETED INDUSTRY CATEGORIES UNDER THE SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM (MAY 1999).

[Complete only if the Offeror has represented itself under the provision at 52.219-1 as a small business concern under the size standards of this solicitation.]

Offeror's number of employees for the past 12 months [*check this column if size standard stated in solicitation is expressed in terms of number of employees*] or Offeror's average annual gross revenue for the last 3 fiscal years [*check this column if size standard in solicitation is expressed in terms of annual receipts*]. [*Check one of the following.*]

NO. OF EMPLOYEES	AVERAGE ANNUAL GROSS REVENUES
____ 50 or fewer	____ \$1 million or less
____ 51 - 100	____ \$1,000,001 - \$2 million
____ 101 - 250	____ \$2,000,001 - \$3.5 million
____ 251 - 500	____ \$3,500,001 - \$5 million
____ 501 - 750	____ \$5,000,001 - \$10 million
____ 751 - 1,000	____ \$10,000,001 - \$17 million
____ Over 1,000	____ Over \$17 million

13. (FAR 52.222-21) CERTIFICATION OF NONSEGREGATED FACILITIES (FEB 1999).

(a) "Segregated facilities," as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, or national origin because of written or oral policies or employee custom. The term does not include separate or

single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.

(b) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Opportunity clause in this contract.

(c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Opportunity clause of this contract.

(End of clause)

14. (FAR 52.222-22) PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (FEB 1999).

(a) It ☐ has, ☐ has not participated in a previous contract or subcontract subject the Equal Opportunity clause of this solicitation;

(b) It ☐ has, ☐ has not filed all required compliance reports; and

(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

(End of provision)

15. (FAR 52.223-4) RECOVERED MATERIAL CERTIFICATION (OCT 1997).

As required by the Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6962(c)(3)(A)(i)), the offeror certifies, by signing this offer, that the percentage of recovered materials to be used in the performance of the contract will be at least the amount required by the applicable contract specifications.

(End of provision)

**16. (FAR 52.223-13) CERTIFICATION OF TOXIC CHEMICAL RELEASE REPORTING (OCT 2000)
[For Contracts over \$100,000]**

(a) Submission of this certification is a prerequisite for making or entering into this contract imposed by Executive Order 12969, August 8, 1995.

(b) By signing this offer, the offeror certifies that-

(1) As the owner or operator of a facilities that will be used in the performance of this contract that are subject to the filing and reporting requirements described in section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023) and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106), the offeror will file and continue to file, for such facilities for the life of the contract the Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of the EPCRA and section 6607 of PPA; or

(2) None of its owned or operated facilities to be used in the performance of this contract is subject the Form R filing and reporting requirements because each facility is exempt for at least one of the following reasons: (Check each block that is applicable.)

☐ (i) The facility does not manufacture, process or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);

☐ (ii) The facility does not have 10 or more full-time employees as specified in section 313(b)(1)(A) of EPCRA, 42 U.S.C. 11023(b)(1)(A);

☐ (iii) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

☐ (iv) The facility does not fall within Standard Industrial Classification Code (SIC) major groups 20 through 39 or their corresponding North American Industry Classification System (NAICS) sectors 31 through 33; or

[] (v) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

17. (DFARS 252.225-7031) SECONDARY ARAB BOYCOTT OF ISRAEL (JUN 1992)

(a) Definitions. As used in this clause--

(1) "Foreign person" means any person other than a United States person as defined in Section 16(2) of the Export Administration Act of 1979 (50 U.S.C. App. Sec 2415).

(2) "United States person" is defined in Section 16(2) of the Export Administration Act of 1979 and means any United States resident or national (other than an individual resident outside the United States and employed by other than a United States person), any domestic concern (including any permanent domestic establishment of any foreign concern), and any foreign subsidiary or affiliate (including any foreign establishment) of any domestic concern which is controlled in fact by such domestic concern, as determined under regulations of the President.

(b) Certification.

By submitting this offer, the Offeror, if a foreign person, company, company or entity, certifies that it--

(1) Does not comply with the Secondary Arab Boycott of Israel; and

(2) Is not taking or knowingly agreeing to take any action, with respect to the Secondary Boycott of Israel by Arab countries, which 50 U.S.C. App. Sec 2407(a) prohibits a United States person from taking.

(End of clause)

18. (DFAR 252.247-7022) REPRESENTATION OF EXTENT OF TRANSPORTATION BY SEA (AUG 1992).

(a) The Offeror shall indicate by checking the appropriate blank in paragraph (b) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term "supplies" is defined in the Transportation of Supplies by Sea clause of this solicitation.

(b) REPRESENTATION. The Offeror represents that it-

_____ Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

_____ Does not anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

(c) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea Clause. If the Offeror represents that it will not use ocean transportation, the resulting contract will also include the Defense FAR Supplement clause at 252.247-7024, Notification of Transportation of Supplies by Sea.

19. CONTRACTOR'S CERTIFICATION (Reference FAR 4.102) (Local Provision)

Offerors are cautioned to note the "Contractor's Certification" included in this solicitation and to furnish the information required by paragraph (b), Partnerships, and paragraph (c), Corporations, as appropriate.

(a) CONTRACT WITH INDIVIDUAL. If the resultant contract is with an individual, it shall be signed by the individual in his own name. A contract with an individual doing business as a firm shall be signed by that individual and will ordinarily take the following form.

_____ (Signed)

An individual doing business as

(b) CONTRACTS WITH PARTNERSHIPS. If the resultant contract is with a partnership, it need be signed by only one partner PROVIDED the partner signing has the authority to legally bind the partnership. In addition, the following statement shall be completed:

_____ is a partnership composed of
(Firm Name)

(List All Partners)

(Indicate if any partner is limited in partnership authority)

(c) CONTRACTS WITH CORPORATIONS. If the resultant contract is with a corporation, it shall be executed in the corporation name, followed by the word "by" after which the person who has been authorized to execute the contract on behalf of the corporation shall sign his/her name, with the designation of his/her official capacity. In addition, the following certification shall be completed:

I, _____, certify that I am the _____ of the corporation named as Contractor herein, that _____ who signed this contract on behalf of the Contractor was then _____ of said corporation, that said contract was duly for and on behalf of said corporation by authority of the governing body and is within the scope of its corporate powers.

In witness whereof, I have hereunto affixed my signature this ____ day of _____, 19 ____.

(Signature, Printed Name, Title)

(d) CONTRACT WITH JOINT VENTURES. If the resultant contract is with a joint venture, each participant shall sign and in the manner indicated above for each type of participant. In addition, to assure a single point of contact for resolution of contractual matters and payments, the following certification shall be signed by each participant in the joint venture.

The parties hereto expressly understand and agree as follows:

(1) _____
(Name) (Title) (Company)

is the principal representative of the joint venture. As such, all communications regarding the administration of the contract and the performance of the work thereunder may be directed to him. In the absence of:

(Name) (Title) (Company as above)

(Name) (Title) (Company of Alternate)

is the alternate principle of the joint venture.

(2) Directions, approvals, required notices, and all other communications from the Government to the joint venture, including transmittal of payments by the Government, shall be directed to:

(Name) (Title) (Company)

principal representative of the joint venture.

(e) SIGNATURE OF AGENTS. If the resultant contract is signed by an agent, other than as stated above, the fact of the agency will be evidenced by a copy of the Power of Attorney.

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SECTION 00700

CONTRACT CLAUSES

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72. *FAR 52.228-5 INSURANCE--WORK ON A GOVERNMENT INSTALLATION (JAN 1997) [For Contracts Exceeding \$100,000]
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74. *FAR 52.228-12 PROSPECTIVE SUBCONTRACTOR REQUESTS FOR BONDS (OCT 1995)
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79. FAR 52.230-1 COST ACCOUNTING STANDARDS NOTICES AND CERTIFICATION (JUNE 2000)
80. *FAR 52.230-2 COST ACCOUNTING STANDARDS (APR 1998)
81. *FAR 52.230-3 DISCLOSURE AND CONSISTENCY OF COST ACCOUNTING PRACTICES (APR 1998)
82. DFARS 252.231-7000 SUPPLEMENTAL COST PRINCIPLES (DEC 1991)
83. *FAR 52.232-5 PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (MAY 1997)
84. RESERVED.
85. *FAR 52.232-10 PAYMENTS UNDER FIXED-PRICE ARCHITECT-ENGINEER CONTRACTS (AUG 1987)
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88. *FAR 52.232-26 PROMPT PAYMENT FOR FIXED-PRICE ARCHITECT-ENGINEER CONTRACTS (FEB 2002)
89. *FAR 52.232-27 PROMPT PAY FOR CONSTRUCTION CONTRACTS (FEB 2002)
90. *FAR 52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER--CENTRAL CONTRACTOR REGISTRATION (MAY 1999)
91. DFARS 252.232-7004 DOD PROGRESS PAYMENT RATES (OCT 2001)
92. DFARS 252.232-7005 REIMBURSEMENT OF SUBCONTRACTOR ADVANCE PAYMENTS--DOD PILOT MENTOR-PROTEGE PROGRAM (SEP 2001)
93. *FAR 52.233-1 DISPUTES (JULY 2002)
94. *FAR 52.233-11 DISPUTES (JULY 2002) ALTERNATE I (DEC 1991)
95. *FAR 52.233-3 PROTEST AFTER AWARD (AUG 1996)
96. RESERVED.
97. FAR 52.236-2 DIFFERING SITE CONDITIONS (APR 1984)
98. *FAR 52.236-3 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (APR 1984)
99. *FAR 52.236-5 MATERIAL AND WORKMANSHIP (APR 1984)
100. *FAR 52.236-6 SUPERINTENDENCE BY THE CONTRACTOR (APR 1984)
101. FAR 52.236-7 PERMITS AND RESPONSIBILITIES (NOV 1991)
102. *FAR 52.236-8 OTHER CONTRACTS (APR 1984)
103. *FAR 52.236-9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984)
104. FAR 52.236-10 OPERATIONS AND STORAGE AREAS (APR 1984)
105. *FAR 52.236-11 USE AND POSSESSION PRIOR TO COMPLETION (APR 1984)
106. *FAR 52.236-12 CLEANING UP (APR 1984)
107. *FAR 52.236-13 ACCIDENT PREVENTION-ALTERNATE I (NOV 1991)
108. *FAR 52.236-14 AVAILABILITY AND USE OF UTILITY SERVICES (APR 1984)
109. FAR 52.236-15 SCHEDULES FOR CONSTRUCTION CONTRACTS (APR 1984)

110. *FAR 52.236-17 LAYOUT OF WORK (APR 1984)
111. FAR 52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)
112. *FAR 52.236-23 RESPONSIBILITY OF THE ARCHITECT-ENGINEER CONTRACTOR (APR 1984)
113. *FAR 52.236-24 WORK OVERSIGHT IN ARCHITECT-ENGINEER CONTRACTS (APR 1984)
114. *FAR 52.236-25 REQUIREMENTS FOR REGISTRATION OF DESIGNERS (APR 1984)
115. *FAR 52.236-26 PRECONSTRUCTION CONFERENCE (FEB 1995)
116. DFARS 252.236-7000 MODIFICATION OF PROPOSALS - PRICE BREAKDOWN (DEC 1991)
117. *FAR 52.242-13 BANKRUPTCY (JUL 1995)
118. *FAR 52.242-14 SUSPENSION OF WORK (APR 1984)
119. DFARS 252.242-7005 COST/SCHEDULE STATUS REPORT (MAR 1998)
120. *FAR 52.243-1 CHANGES--FIXED-PRICE (AUG 1987) ALTERNATE III (AUG 1984)
121. FAR 52.243-4 CHANGES (AUG 1987)
122. DFARS 252.243-7001 PRICING OF CONTRACT MODIFICATIONS (DEC 1991)
123. DFARS 252.243-7002 REQUESTS FOR EQUITABLE ADJUSTMENT (MAR 1998)
124. *FAR 52.244-2 SUBCONTRACTS (AUG 1998)
125. *FAR 52.244-4 SUBCONTRACTORS AND OUTSIDE ASSOCIATES AND CONSULTANTS (ARCHITECT-ENGINEER SERVICES) (AUG 1998)
126. FAR 52.244-6 SUBCONTRACTS FOR COMMERCIAL ITEMS (MAY 2002)
127. *FAR 52.245-2 GOVERNMENT PROPERTY (FIXED-PRICE CONTRACTS) (DEC 1989) [For Government Property over \$100,000]
128. *FAR 52.245-4 GOVERNMENT-FURNISHED PROPERTY (SHORT FORM) (APR 1984) [For Government Property \$100,000 or Less]
129. *FAR 52.246-12 INSPECTION OF CONSTRUCTION (AUG 1996)
130. *FAR 52.246-21 WARRANTY OF CONSTRUCTION (MAR 1994)
131. DFARS 252.247-7023 TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)
132. DFARS 252.247-7024 NOTIFICATION OF TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)
133. ~~DELETED FAR 52.248-3 VALUE ENGINEERING—CONSTRUCTION (FEB 2000) (ALTERNATE I (APR 1984))~~
134. *FAR 52.249-2 TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) ALTERNATE I (SEP 1996) [For Contracts Over \$100,000]
135. *FAR 52.249-10 DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984)
136. ENVIRONMENTAL LITIGATION (1974 NOV OCE)
137. EFARS 52.249-5000 BASIS FOR SETTLEMENT OF PROPOSALS

SECTION 00700

CONTRACT CLAUSES

1. FAR 52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

<http://www.arnet.gov/far>

(End of clause)

*** - CONTRACT CLAUSES THAT MAY BE INCORPORATED BY REFERENCE**

2. DFARS 252.201-7000 CONTRACTING OFFICER'S REPRESENTATIVE (DEC 1991)

(a) Definition.

"Contracting officer's representative" means an individual designated in accordance with subsection 201.602-2 of the Defense Federal Acquisition Regulation Supplement and authorized in writing by the contracting officer to perform specific technical or administrative functions.

(b) If the Contracting Officer designates a contracting officer's representative (COR), the Contractor will receive a copy of the written designation. It will specify the extent of the COR's authority to act on behalf of the contracting officer. The COR is not authorized to make any commitments or changes that will affect price, quality, quantity, delivery, or any other term or condition of the contract.

(End of clause)

3. *FAR 52.202-1 DEFINITIONS (DEC 2001) ALTERNATE I (MAY 2001)

a) "Agency head" or "head of the agency" means the Secretary (Attorney General, Administrator, Governor, Chairperson, or other chief official, as appropriate) of the agency, unless otherwise indicated, including any deputy or assistant chief official of the executive agency.

(b) "Commercial component" means any component that is a commercial item.

(c) "Commercial item" means—

(1) Any item, other than real property, that is of a type customarily used by the general public or by non-governmental entities for purposes other than governmental purposes, and that—

(i) Has been sold, leased, or licensed to the general public; or

(ii) Has been offered for sale, lease, or license to the general public;

(2) Any item that evolved from an item described in paragraph (c)(1) of this clause through advances in technology or performance and that is not yet available in the commercial marketplace, but will be available in the commercial marketplace in time to satisfy the delivery requirements under a Government solicitation;

(3) Any item that would satisfy a criterion expressed in paragraphs (c)(1) or (c)(2) of this clause, but for—

(i) Modifications of a type customarily available in the commercial marketplace; or

(ii) Minor modifications of a type not customarily available in the commercial

marketplace made to meet Federal Government requirements. "Minor" modifications means modifications that do not significantly alter the nongovernmental function or essential physical characteristics of an item or component, or change the purpose of a process. Factors to be considered in determining whether a modification is minor include the value and size of the modification and the comparative value and size of the final product. Dollar values and percentages may be used as guideposts, but are not conclusive evidence that a modification is minor;

(4) Any combination of items meeting the requirements of paragraphs (c)(1), (2), (3), or (5) of this clause that are of a type customarily combined and sold in combination to the general public;

(5) Installation services, maintenance services, repair services, training services, and other services if—

(i) Such services are procured for support of an item referred to in paragraph (c)(1), (2), (3), or (4) of this definition, regardless of whether such services are provided by the same source or at the same time as the item; and

(ii) The source of such services provides similar services contemporaneously to the general public under terms and conditions similar to those offered to the Federal Government

(6) Services of a type offered and sold competitively in substantial quantities in the commercial marketplace based on established catalog or market prices for specific tasks performed under standard commercial terms and conditions. This does not include services that are sold based on hourly rates without an established catalog or market price for a specific service performed. For purposes of these services—

(i) "Catalog price" means a price included in a catalog, price list, schedule, or other form that is regularly maintained by the manufacturer or vendor, is either published or otherwise available for inspection by customers, and states prices at which sales are currently, or were last, made to a significant number of buyers constituting the general public; and

(ii) "Market prices" means current prices that are established in the course of ordinary trade between buyers and sellers free to bargain and that can be substantiated through competition or from sources independent of the offerors.

(7) Any item, combination of items, or service referred to in paragraphs (c)(1) through (c)(6), notwithstanding the fact that the item, combination of items, or service is transferred between or among separate divisions, subsidiaries, or affiliates of a Contractor; or

(8) A nondevelopmental item, if the procuring agency determines the item was developed exclusively at private expense and sold in substantial quantities, on a competitive basis, to multiple State and local Governments.

(d) "Component" means any item supplied to the Government as part of an end item or of another component, except that for use in 52.225-9, and 52.225-11 see the definitions in 52.225-9(a) and 52.225-11(a).

(e) "Contracting Officer" means a person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings. The term includes certain authorized representatives of the Contracting Officer acting within the limits of their authority as delegated by the Contracting Officer.

(f) "Nondevelopmental item" means—

(1) Any previously developed item of supply used exclusively for governmental purposes by a Federal agency, a State or local government, or a foreign government with which the United States has a mutual defense cooperation agreement;

(2) Any item described in paragraph (f)(1) of this definition that requires only minor modification or modifications of a type customarily available in the commercial marketplace in order to meet the requirements of the procuring department or agency; or

(3) Any item of supply being produced that does not meet the requirements of paragraph (f)(1) or (f)(2) solely because the item is not yet in use.

(End of clause)

4. *FAR 52.203-3 GRATUITIES (APR 1984)

(a) The right of the Contractor to proceed may be terminated by written notice if, after notice and hearing, the agency head or a designee determines that the Contractor, its agent, or another representative--

(1) Offered or gave a gratuity (e.g., an entertainment or gift) to an officer, official, or employee of the Government; and

- (2) Intended, by the gratuity, to obtain a contract or favorable treatment under a contract.
- (b) The facts supporting this determination may be reviewed by any court having lawful jurisdiction.
- (c) If this contract is terminated under paragraph (a) above, the Government is entitled--
 - (1) To pursue the same remedies as in a breach of the contract; and
 - (2) In addition to any other damages provided by law, to exemplary damages of not less than 3 nor more than 10 times the cost incurred by the Contractor in giving gratuities to the person concerned, as determined by the agency head or a designee. (This subparagraph (c)(2) is applicable only if this contract uses money appropriated to the Department of Defense.)
- (d) The rights and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

5. *FAR 52.203-5 COVENANT AGAINST CONTINGENT FEES (APR 1984)

(a) The Contractor warrants that no person or agency has been employed or retained to solicit or obtain this contract upon an agreement or understanding for a contingent fee, except a bona fide employee or agency. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or, in its discretion, to deduct from the contract price or consideration, or otherwise recover, the full amount of the contingent fee.

(b) "Bona fide agency," as used in this clause, means an established commercial or selling agency, maintained by a contractor for the purpose of securing business, that neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds itself out as being able to obtain any Government contract or contracts through improper influence.

"Bona fide employee," as used in this clause, means a person, employed by a contractor and subject to the contractor's supervision and control as to time, place, and manner of performance, who neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds out as being able to obtain any Government contract or contracts through improper influence.

"Contingent fee," as used in this clause, means any commission, percentage, brokerage, or other fee that is contingent upon the success that a person or concern has in securing a Government contract.

"Improper influence," as used in this clause, means any influence that induces or tends to induce a Government employee or officer to give consideration or to act regarding a Government contract on any basis other than the merits of the matter.

6. *FAR 52.203-7 ANTI-KICKBACK PROCEDURES (JUL 1995)

(a) Definitions.

"Kickback," as used in this clause, means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided, directly or indirectly, to any prime Contractor, prime Contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a subcontract relating to a prime contract. "Person," as used in this clause, means a corporation, partnership, business association of any kind, trust, joint-stock company, or individual.

"Prime contract," as used in this clause, means a contract or contractual action entered into by the United States for the purpose of obtaining supplies, materials, equipment, or services of any kind.

"Prime Contractor," as used in this clause, means a person who has entered into a prime contract with the United States.

"Prime Contractor employee," as used in this clause, means any officer, partner, employee, or agent of a prime Contractor.

"Subcontract," as used in this clause, means a contract or contractual action entered into by a prime Contractor or subcontractor for the purpose of obtaining supplies, materials, equipment, or services of any kind under a prime contract.

"Subcontractor," as used in this clause, (1) means any person, other than the prime Contractor, who offers to furnish or furnishes any supplies, materials, equipment, or services of any kind under a prime contract or a subcontract entered into in connection with such prime contract, and (2) includes any person who offers to furnish or furnishes general supplies to the prime Contractor or a higher tier subcontractor.

"Subcontractor employee," as used in this clause, means any officer, partner, employee, or agent of a subcontractor.

(b) The Anti-Kickback Act of 1986 (41 U.S.C. 51-58) (the Act), prohibits any person from--
(1) Providing or attempting to provide or offering to provide any kickback;
(2) Soliciting, accepting, or attempting to accept any kickback; or
(3) Including, directly or indirectly, the amount of any kickback in the contract price charged by a prime Contractor to the United States or in the contract price charged by a subcontractor to a prime Contractor or higher tier subcontractor.

(c) (1) The Contractor shall have in place and follow reasonable procedures designed to prevent and detect possible violations described in paragraph (b) of this clause in its own operations and direct business relationships.

(2) When the Contractor has reasonable grounds to believe that a violation described in paragraph (b) of this clause may have occurred, the Contractor shall promptly report in writing the possible violation. Such reports shall be made to the inspector general of the contracting agency, the head of the contracting agency if the agency does not have an inspector general, or the Department of Justice.

(3) The Contractor shall cooperate fully with any Federal agency investigating a possible violation described in paragraph (b) of this clause.

(4) The Contracting Officer may
(i) offset the amount of the kickback against any monies owed by the United States under the prime contract and/or
(ii) direct that the Prime Contractor withhold from sums owed a subcontractor under the prime contract the amount of the kickback. The Contracting Officer may order that monies withheld under subdivision (c)(4)(ii) of this clause be paid over to the Government unless the Government has already offset those monies under subdivision (c)(4)(i) of this clause. In either case, the Prime Contractor shall notify the Contracting Officer when the monies are withheld.

(5) The Contractor agrees to incorporate the substance of this clause, including subparagraph (c)(5) but excepting subparagraph (c)(1), in all subcontracts under this contract which exceed \$100,000.

7. *FAR 52.203-8 CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)

(a) If the Government receives information that a contractor or a person has engaged in conduct constituting a violation of subsection (a), (b), (c), or (d) of Section 27 of the Office of Federal Procurement Policy Act (41 U.S.C. 423) (the Act), as amended by section 4304 of the National Defense Authorization Act for Fiscal Year 1996 (Pub. L. 104-106), the Government may--

(1) Cancel the solicitation, if the contract has not yet been awarded or issued; or

(2) Rescind the contract with respect to which--

(i) The Contractor or someone acting for the Contractor has been convicted for an offense where the conduct constitutes a violation of subsection 27 (a) or (b) of the Act for the purpose of either--

(A) Exchanging the information covered by such subsections for anything of value; or

(B) Obtaining or giving anyone a competitive advantage in the award of a Federal agency procurement contract; or

(ii) The head of the contracting activity has determined, based upon a preponderance of the evidence, that the Contractor or someone acting for the Contractor has engaged in conduct constituting an offense punishable under subsection 27(e)(1) of the Act.

(b) If the Government rescinds the contract under paragraph (a) of this clause, the Government is entitled to recover, in addition to any penalty prescribed by law, the amount expended under the contract.

(c) The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law, regulation, or under this contract.

8. DFARS 252.203-7001 PROHIBITION ON PERSONS CONVICTED OF FRAUD OR OTHER DEFENSE—CONTRACT-RELATED FELONIES (MARCH 1999)

- (a) Definitions.
As used in this clause--
 - (1) "Arising out of a contract with the "DoD" means any any act in connection with--
 - (i) Attempting to obtain;
 - (ii) Obtaining; or
 - (iii) Performing a contract or first-tier subcontract of any department, or component of the Department of Defense (DoD).
 - (2) "Conviction of fraud or any other felony," means any conviction for fraud or a felony in violation of state or Federal criminal statutes, whether entered on a verdict or plea, including a plea of nolo contendere, for which sentence has been imposed.
 - (3) "Date of conviction," means the date judgement was entered against the individual.
- (b) Any individual who is convicted after September 29, 1988 of fraud or any other felony arising out of a contract with the DoD is prohibited from serving--
 - (1) In a management or supervisory capacity on any DoD contract or first-tier subcontract;
 - (2) On board of directors of any DoD Contractor or first-tier subcontractor;
 - (3) As a consultant to any DoD Contractor or first-tier subcontractor; or
 - (4) In any other capacity with the authority to influence, advise, or control the decisions of any DoD contractor or subcontractor with regard to any DoD contract or first-tier subcontract.
- (c) Unless waived, the prohibition in paragraph (b) of this clause applies for not less than five years from the date of conviction.
- (d) 10 U.S.C. 2408 provides that a defense Contractor or first-tier subcontractor shall be subject to a criminal penalty of not more than \$500,000 if convicted of knowingly--
 - (1) Employing a person under a prohibition in paragraph (b) of this clause;
 - (2) Allowing such a person to serve on the board of directors of Contractor or first-tier subcontractor.
- (e) In addition to the criminal penalties contained in 10 U.S.C. 2408, the Government may consider other available remedies, such as--
 - (1) Suspension or debarment;
 - (2) Cancellation of the contract at no cost to the Government; or
 - (3) Termination of the contract for default.
- (f) The Contractor may submit written requests for waiver of the prohibition in paragraph (b) of this clause to the Contracting Officer. Requests shall clearly identify--
 - (1) The person involved;
 - (2) The nature of the conviction and resultant sentence or punishment imposed;
 - (3) The reasons for the requested waiver; and
 - (4) An explanation of why a waiver is in the interest of national security.
- (g) The Contractor agrees to include the substance of this clause appropriately modified to reflect the identity and relationship of the parties, in all first-tier subcontracts exceeding the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation, except those for commercial items or components.
- (h) Pursuant to 10 U.S.C.2408(c), defense contractors and subcontractors may obtain information as to whether a particular has been convicted of fraud or any other felony arising out of a contract with the DoD by contracting The Office of Justice Programs, The Denial of Federal Benefits Office, U.S. Department of Justice, telephone (202) 616-3507.

9. RESERVED

10. *FAR 52.203-10 PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)

(a) The Government, at its election, may reduce the price of a fixed-price type contract and the total cost and fee under a cost-type contract of profit or fee determined as set forth in paragraph (b) of this clause if the head of the contracting activity or designee determines that there was a violation of subsection 27(a), (b), or (c) of the Office of Federal Procurement Policy Act, as amended (41 U.S.C. 423), as implemented in section 3.104 of the Federal Acquisition Regulation.

(b) The price or fee reduction referred to in paragraph (a) of this clause shall be--

(1) For cost-plus-fixed-fee contracts, the amount of the fee specified in the contract at the time of award;

(2) For cost-plus-incentive-fee contracts, the target fee specified in the contract at the time of award, notwithstanding any minimum fee or "fee floor" specified in the contract;

(3) For cost-plus-award-fee contracts--

(i) The base fee established in the contract at the time of contract award;

(ii) If no base fee is specified in the contract, 30 percent of the amount of each award fee otherwise payable to the Contractor for each award fee evaluation period or at each award fee determination point.

(4) For fixed-price-incentive contracts, the Government may--

(i) Reduce the contract target price and contract target profit both by an amount equal to the initial target profit specified in the contract at the time of contract award; or

(ii) If an immediate adjustment to the contract target price and contract target profit would have a significant adverse impact on the incentive price revision relationship under the contract, or adversely affect the contract financing provisions, the Contracting Officer may defer such adjustment until establishment of the total final price of the contract. The total final price established in accordance with the incentive price revision provisions of the contract shall be reduced by an amount equal to the initial target profit specified in the contract at the time of contract award and such reduced price shall be the total final contract price.

(5) For firm-fixed-price contracts, by 10 percent of the initial contract price or a profit amount determined by the Contracting Officer from records or documents in existence prior to the date of the contract award.

(c) The Government may, at its election, reduce a prime contractor's price or fee in accordance with the procedures of paragraph (b) of this clause for violations of the Act by its subcontractors by an amount not to exceed the amount of profit or fee reflected in the subcontract at the time the subcontract was first definitively priced.

(d) In addition to the remedies in paragraphs (a) and (c) of this clause, the Government may terminate this contract for default. The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law or under this contract.

11. *FAR 52.203-12 LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (JUN 1997)

(a) Definitions.

"Agency," as used in this clause, means executive agency as defined in 2.101.

"Covered Federal Action," as used in this clause, means any of the following Federal actions:

(1) The awarding of any Federal contract.

(2) The making of any Federal grant.

(3) The making of any Federal loan.

(4) The entering into of any cooperative agreement.

(5) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

"Indian tribe" and "tribal organization," as used in this clause, have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B) and include Alaskan Natives.

"Influencing or attempting to influence," as used in this clause, means making, with the intent to influence, any communication to or appearance before an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.

"Local government," as used in this clause, means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, including a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.

"Officer or employee of an agency," as used in this clause, includes the following individuals who are employed by an agency:

(1) An individual who is appointed to a position in the Government under title 5, United States Code, including a position under a temporary appointment.

(2) A member of the uniformed services, as defined in subsection 101(3), title 37, United States Code.

(3) A special Government employee, as defined in section 202, title 18, United States Code.

(4) An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, title 5, United States Code, appendix 2.

"Person," as used in this clause, means an individual, corporation, company, association, authority, firm, partnership, society, State and local government, regardless of whether such entity is operated for profit, or not for profit. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Reasonable compensation," as used in this clause, means, with respect to a regularly employed officer or employee of any person, compensation that is consistent with the normal compensation for such officer or employee for work that is not furnished to, not funded by, or not furnished in cooperation with the Federal Government.

"Reasonable payment," as used in this clause, means, with respect to professional and other technical services, a payment in an amount that is consistent with the amount normally paid for such services in the private sector.

"Recipient," as used in this clause, includes the Contractor and all subcontractors. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Regularly employed," as used in this clause, means, with respect to an officer or employee of a person requesting or receiving a Federal contract, an officer or employee who is employed by such person for at least 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract. An officer or employee who is employed by such person for less than 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

"State," as used in this clause, means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or possession of the United States, an agency or instrumentality of a State, and multi-State, regional, or interstate entity having governmental duties and powers.

(b) Prohibitions.

(1) Section 1352 of title 31, United States Code, among other things, prohibits a recipient of a Federal Contract, grant, loan, or cooperative agreement from using appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: The awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.

(2) The Act also requires Contractors to furnish a disclosure if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or cooperative agreement.

(3) The prohibitions of the Act do not apply under the following conditions:

(i) Agency and legislative liaison by own employees.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action if the payment is for agency and legislative liaison activities not directly related to a covered Federal action.

(B) For purposes of subdivision (b)(3)(i)(A) of this clause, providing any information specifically requested by an agency or Congress is permitted at any time.

(C) The following agency and legislative liaison activities are permitted at any time where they are not related to a specific solicitation for any covered Federal action:

(1) Discussing with an agency the qualities and characteristics (including individual demonstrations) of the person's products or services, conditions or terms of sale, and service capabilities.

(2) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.

(D) The following agency and legislative liaison activities are permitted where they are prior to formal solicitation of any covered Federal action--

(1) Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;

(2) Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and

(3) Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Pub. L. 95-507, and subsequent amendments.

(E) Only those services expressly authorized by subdivision (b)(3)(i)(A) of this clause are permitted under this clause.

(ii) Professional and technical services.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of--

(1) A payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action, if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action.

(2) Any reasonable payment to a person, other than an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action. Persons other than officers or employees of a person requesting or receiving a covered Federal action include consultants and trade associations.

(B) For purposes of subdivision (b)(3)(ii)(A) of this clause, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not

allowable under this section since the engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.

(C) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation and any other requirements in the actual award documents.

(D) Only those services expressly authorized by subdivisions (b)(3)(ii)(A)(1) and (2) of this clause are permitted under this clause.

(E) The reporting requirements of FAR 3.803(a) shall not apply with respect to payments of reasonable compensation made to regularly employed officers or employees of a person.

(iii) Disclosure.

(A) The Contractor who requests or receives from an agency a Federal contract shall file with that agency a disclosure form, OMB standard form LLL, Disclosure of Lobbying Activities, if such person has made or has agreed to make any payment using nonappropriated funds (to include profits from any covered Federal action), which would be prohibited under subparagraph (b)(1) of this clause, if paid for with appropriated funds.

(B) The Contractor shall file a disclosure form at the end of each calendar quarter in which there occurs any event that materially affects the accuracy of the information contained in any disclosure form previously filed by such person under subparagraph (c)(1) of this clause. An event that materially affects the accuracy of the information reported includes--

(1) A cumulative increase of \$25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or

(2) A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or

(3) A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

(C) The Contractor shall require the submittal of a certification, and if required, a disclosure form by any person who requests or receives any subcontract exceeding \$100,000 under the Federal contract.

(D) All subcontractor disclosure forms (but not certifications) shall be forwarded from tier to tier until received by the prime Contractor. The prime Contractor shall submit all disclosures to the Contracting Officer at the end of the calendar quarter in which the disclosure form is submitted by the subcontractor. Each subcontractor certification shall be retained in the subcontract file of the awarding Contractor.

(iv) Agreement. The Contractor agrees not to make any payment prohibited by this clause.

(v) Penalties.

(A) Any person who makes an expenditure prohibited under paragraph (a) of this clause or who fails to file or amend the disclosure form to be filed or amended by paragraph (b) of this clause shall be subject to civil penalties as provided for by 31 U.S.C. 1352. An imposition of a civil penalty does not prevent the Government from seeking any other remedy that may be applicable.

(B) Contractors may rely without liability on the representation made by their subcontractors in the certification and disclosure form.

(vi) Cost allowability. Nothing in this clause makes allowable or reasonable any costs which would otherwise be unallowable or unreasonable. Conversely, costs made specifically unallowable by the requirements in this clause will not be made allowable under any other provision.

12. DFARS 252.203-7002 DISPLAY OF DOD HOTLINE POSTER (DEC 1991) **(For Military Contracts Exceeding \$5,000,000)**

(a) The Contractor shall display prominently in common work areas within business segments performing work under Department of Defense (DoD) contracts, DoD Hotline Posters prepared by DoD Office of the Inspector General.

(b) DoD Hotline Posters may be obtained from the DoD Inspector General, ATTN: Defense Hotline, 400 Army Navy Drive, Washington DC 22202-2884.

(c) The Contract need not comply with paragraph (a) of this clause if it has established a mechanism, such as a hotline, by which employees may report suspected instances of improper conduct, and instructions that encourage employees to make such reports.

13. *FAR 52.204-4 PRINTED OR COPIED DOUBLE-SIDED ON RECYCLED PAPER (AUG 2000)

(a) Definitions. As used in this clause—

“Postconsumer material” means a material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item. Postconsumer material is a part of the broader category of “recovered material.” For paper and paper products, postconsumer material means “postconsumer fiber” defined by the U.S. Environmental Protection Agency (EPA) as—

(1) Paper, paperboard, and fibrous materials from retail stores, office buildings, homes, and so forth, after they have passed through their end-usage as a consumer item, including: used corrugated boxes; old newspapers; old magazines; mixed waste paper; tabulating cards; and used cordage; or

(2) All paper, paperboard, and fibrous materials that enter and are collected from municipal solid waste; but not

(3) Fiber derived from printers' over-runs, converters' scrap, and over-issue publications.

“Printed or copied double-sided” means printing or reproducing a document so that information is on both sides of a sheet of paper.

“Recovered material,” for paper and paper products, is defined by EPA in its Comprehensive Procurement Guideline as “recovered fiber” and means the following materials:

(1) Postconsumer fiber; and

(2) Manufacturing wastes such as—

(i) Dry paper and paperboard waste generated after completion of the papermaking process (that is, those manufacturing operations up to and including the cutting and trimming of the paper machine reel into smaller rolls or rough sheets) including: envelope cuttings, bindery trimmings, and other paper and paperboard waste resulting from printing, cutting, forming, and other converting operations; bag, box, and carton manufacturing wastes; and butt rolls, mill wrappers, and rejected unused stock; and

(ii) Repulped finished paper and paperboard from obsolete inventories of paper and paperboard manufacturers, merchants, wholesalers, dealers, printers, converters, or others.

(b) In accordance with Section 101 of Executive Order 13101 of September 14, 1998, Greening the Government through Waste Prevention, Recycling, and Federal Acquisition, the Contractor is encouraged to submit paper documents, such as offers, letters, or reports, that are printed or copied double-sided on recycled paper that meet minimum content standards specified in Section 505 of Executive Order 13101, when not using electronic commerce methods to submit information or data to the Government.

(c) If the Contractor cannot purchase high-speed copier paper, offset paper, forms bond, computer printout paper, carbonless paper, file folders, white wove envelopes, writing and office paper, book paper, cotton fiber paper, and cover stock meeting the 30 percent postconsumer material standard for use in submitting paper documents to the Government, it should use paper containing no less than 20 percent postconsumer material. This lesser standard should be used only when paper meeting the 30 percent postconsumer material standard is not obtainable at a reasonable price or does not meet reasonable performance standards.

(End of clause)

14. DFARS 252.204-7003 CONTROL OF GOVERNMENT PERSONNEL WORK PRODUCT (APR 1992)

The Contractor's procedures for protecting against unauthorized disclosure of information shall not require Department of Defense employees or members of the Armed Forces to relinquish control of their work products, whether classified or not, to the Contractor.

15. *FAR 52.209-6 PROTECTING THE GOVERNMENTS INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT (JUL 1995)

(a) The Government suspends or debar Contractors to protect the Government's interests. The Contractor shall not enter into any subcontract in excess of \$25,000 with a Contractor that is debarred, suspended, or proposed for debarment unless there is a compelling reason to do so.

(b) The Contractor shall require each proposed first-tier subcontractor, whose subcontract will exceed \$25,000, to disclose to the Contractor, in writing, whether as of the time of award of the subcontract, the subcontractor, or its principals, is or is not debarred, suspended, or proposed for debarment by the Federal Government.

(c) A corporate office or a designee of the Contractor shall notify the Contracting Officer, in writing, before entering into a subcontract with a party that is debarred, suspended, or proposed for debarment (see FAR 9.404 for information on the List of Parties Excluded from Procurement Programs). The notice must include the following:

- (1) The name of the subcontractor.
- (2) The Contractor's knowledge of the reasons for the subcontractor being on the List of Parties Excluded from Procurement Programs.
- (3) The compelling reason(s) for doing business with the subcontractor notwithstanding its inclusion on the List of Parties Excluded From Procurement Programs.
- (4) The systems and procedures the Contractor has established to ensure that it is fully protecting the Government's interests when dealing with such subcontractor in view of the specific basis for the party's debarment, suspension, or proposed debarment.

16. DFARS 252.209-7004 SUBCONTRACTING WITH FIRMS THAT ARE OWNED OR CONTROLLED BY THE GOVERNMENT OF A TERRORIST COUNTRY (MAR 1998)

(a) Unless the Government determines that there is a compelling reason to do so, the Contractor shall not enter into any subcontract in excess of \$25,000 with a firm, or a subsidiary of a firm, that is identified, on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs, as being ineligible for the award of Defense contracts or subcontracts because it is owned or controlled by the government of a terrorist country.

(b) A corporate officer or a designee of the Contractor shall notify the Contracting Officer, in writing, before entering into a subcontract with a party that is identified, on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs, as being ineligible for the award of Defense contracts or subcontracts because it is owned or controlled by the government of a terrorist country. The notice must include the name of the proposed subcontractor and the compelling reason(s) for doing business with the subcontractor notwithstanding its inclusion on the List of Parties Excluded From Federal Procurement and Nonprocurement Programs.

(End of clause)

17. *FAR 52.211-15 DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS (SEP 1990) [For Military Contract's Only]

This is a rated order certified for national defense use, and the Contractor shall follow all the requirements of the Defense Priorities and Allocations System regulation (15 CFR 700).

18. ~~DELETED FAR 52.211-18~~ ————— ~~VARIATION IN ESTIMATED QUANTITY (APR 1984)~~

~~If the quantity of a unit priced item in this contract is an estimated quantity and the actual quantity of the unit priced item varies more than 15 percent above or below the estimated quantity, an equitable adjustment in the contract price shall be made upon demand of either party. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variation above 115 percent or below 85 percent of the estimated quantity. If the quantity variation is such as to cause an increase in the time necessary for completion, the Contractor may request, in writing, an extension of time, to be received by the Contracting Officer within 10 days from the beginning of the delay, or within such further period as may be granted by the Contracting Officer before the date of final settlement of the contract. Upon the receipt of a written request for an extension, the Contracting Officer shall ascertain the facts and make an adjustment for extending the completion date as, in the judgement of the Contracting Officer, is justified.~~

19. *FAR 52.215-2 AUDIT AND RECORDS-NEGOTIATION (JUNE 1999)

(a) As used in this clause, "records" includes books, documents, accounting procedures and practices, and other data, regardless of type and regardless of whether such items are in written form, in the form of computer data, or in any other form.

(b) Examination of costs. If this is a cost-reimbursement, incentive, time-and-materials, labor-hour, or price redeterminable contract, or any combination of these, the Contractor shall maintain and the Contracting Officer, or an authorized representative of the Contracting Officer, shall have the right to examine and audit all records and other evidence sufficient to reflect properly all costs claimed to have been incurred or anticipated to be incurred directly or indirectly in performance of this contract. This right of examination shall include inspection at all reasonable times of the Contractor's plants, or parts of them, engaged in performing the contract.

(c) Cost or pricing data. If the Contractor has been required to submit cost or pricing data in connection with any pricing action relating to this contract, the Contracting Officer, or an authorized representative of the Contracting Officer, in order to evaluate the accuracy, completeness, and currency of the cost or pricing data, shall have the right to examine and audit all of the Contractor's records, including computations and projections, related to--

- (1) The proposal for the contract, subcontract, or modification;
- (2) The discussions conducted on the proposal(s), including those related to negotiating;
- (3) Pricing of the contract, subcontract, or modification; or
- (4) Performance of the contract, subcontract or modification.

(d) Comptroller General--(1) The Comptroller General of the United States, or an authorized representative, shall have access to and the right to examine any of the Contractor's directly pertinent records involving transactions related to this contract or a subcontract hereunder.

(2) This paragraph may not be construed to require the Contractor or subcontractor to create or maintain any record that the Contractor or subcontractor does not maintain in the ordinary course of business or pursuant to a provision of law.

(e) Reports. If the Contractor is required to furnish cost, funding, or performance reports, the Contracting Officer or an authorized representative of the Contracting Officer shall have the right to examine and audit the supporting records and materials, for the purpose of evaluating--

(1) The effectiveness of the Contractor's policies and procedures to produce data compatible with the objectives of these reports; and

(2) The data reported.

(f) Availability. The Contractor shall make available at its office at all reasonable times the records, materials, and other evidence described in paragraphs (a), (b), (c), (d), and (e) of this clause, for examination, audit, or reproduction, until 3 years after final payment under this contract or for any shorter period specified in Subpart 4.7, Contractor Records Retention, of the Federal Acquisition Regulation (FAR), or for any longer period required by statute or by other clauses of this contract. In addition--

(1) If this contract is completely or partially terminated, the Contractor shall make available the records relating to the work terminated until 3 years after any resulting final termination settlement; and

(2) The Contractor shall make available records relating to appeals under the Disputes clause or to litigation or the settlement of claims arising under or relating to this contract shall be made available until such appeals, litigation, or claims are finally resolved.

(g) The Contractor shall insert a clause containing all the terms of this clause, including this paragraph (g), in all subcontracts under this contract that exceed the simplified acquisition threshold, and--

(1) That are cost-reimbursement, incentive, time-and-materials, labor-hour, or price-redeterminable type or any combination of these;

(2) For which cost or pricing data are required; or

(3) That require the subcontractor to furnish reports as discussed in paragraph (e) of this clause.

The clause may be altered only as necessary to identify properly the contracting parties and the Contracting Officer under the Government prime contract.

(End of clause)

20. *FAR 52.215-10 PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA (OCT 1997)

(a) If any price, including profit or fee, negotiated in connection with this contract, or any cost reimbursable under this contract, was increased by any significant amount because--

(1) The Contractor or a subcontractor furnished cost or pricing data that were not complete, accurate, and current as certified in its Certificate of Current Cost or Pricing Data;

(2) A subcontractor or prospective subcontractor furnished the Contractor cost or pricing data that were not complete, accurate, and current as certified in the Contractor's Certificate of Current Cost or Pricing Data; or

(3) Any of these parties furnished data of any description that were not accurate, the price or cost shall be reduced accordingly and the contract shall be modified to reflect the reduction.

(b) Any reduction in the contract price under paragraph (a) of this clause due to defective data from a prospective subcontractor that was not subsequently awarded the subcontract shall be limited to the amount, plus applicable overhead and profit markup, by which--

(1) The actual subcontract; or

(2) The actual cost to the Contractor, if there was no subcontract, was less than the prospective subcontract cost estimate submitted by the Contractor; provided, that the actual subcontract price was not itself affected by defective cost or pricing data.

(c)(1) If the Contracting Officer determines under paragraph (a) of this clause that a price or cost reduction should be made, the Contractor agrees not to raise the following matters as a defense:

(i) The Contractor or subcontractor was a sole source supplier or otherwise was in a superior bargaining position and thus the price of the contract would not have been modified even if accurate, complete, and current cost or pricing data had been submitted.

(ii) The Contracting Officer should have known that the cost or pricing data in issue were defective even though the Contractor or subcontractor took no affirmative action to bring the character of the data to the attention of the Contracting Officer.

(iii) The contract was based on an agreement about the total cost of the contract and there was no agreement about the cost of each item procured under the contract.

(iv) The Contractor or subcontractor did not submit a Certificate of Current Cost or Pricing Data.

(2)(i) Except as prohibited by subdivision (c)(2)(ii) of this clause, an offset in an amount determined appropriate by the (2)(i) Except as prohibited by subdivision (c)(2)(ii) of this clause, an offset in an amount determined appropriate by the Contracting Officer based upon the facts shall be allowed against the amount of a contract price reduction if--

(A) The Contractor certifies to the Contracting Officer that, to the best of the Contractor's knowledge and belief, the Contractor is entitled to the offset in the amount requested; and

(B) The Contractor proves that the cost or pricing data were available before the "as of" date specified on its Certificate of Current Cost or Pricing Data, and that the data were not submitted before such date.

(ii) An offset shall not be allowed if--

(A) The understated data were known by the Contractor to be understated before the "as of" date specified on its Certificate of Current Cost or Pricing Data; or

(B) The Government proves that the facts demonstrate that the contract price would not have increased in the amount to be offset even if the available data had been submitted before the "as of" date specified on its Certificate of Current Cost or Pricing Data.

(d) If any reduction in the contract price under this clause reduces the price of items for which payment was made prior to the date of the modification reflecting the price reduction, the Contractor shall be liable to and shall pay the United States at the time such overpayment is repaid--

(1) Simple interest on the amount of such overpayment to be computed from the date(s) of overpayment to the Contractor to the date the Government is repaid by the Contractor at the applicable underpayment rate effective for each quarter prescribed by the Secretary of the Treasury under 26 U.S.C. 6621(a)(2); and

(2) A penalty equal to the amount of the overpayment, if the Contractor or subcontractor knowingly submitted cost or pricing data that were incomplete, inaccurate, or noncurrent.

(End of clause)

21. *FAR 52.215-12 SUBCONTRACTOR COST OR PRICING DATA (OCT 1997)

(a) Before awarding any subcontract expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4, on the date of agreement on price or the date of award, whichever is later; or before pricing any subcontract modification involving a pricing adjustment expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4, the Contractor shall require the subcontractor to submit cost or pricing data (actually or by specific identification in writing), unless an exception under FAR 15.403-1 applies.

(b) The Contractor shall require the subcontractor to certify in substantially the form prescribed in FAR 15.406-2 that, to the best of its knowledge and belief, the data submitted under paragraph (a) of this clause were accurate, complete, and current as of the date of agreement on the negotiated price of the subcontract or subcontract modification.

(c) In each subcontract that exceeds the threshold for submission of cost or pricing data at FAR 15.403-4, when entered into, the Contractor shall insert either--

(1) The substance of this clause, including this paragraph (c), if paragraph (a) of this clause requires submission of cost or pricing data for the subcontract; or

(2) The substance of the clause at FAR 52.215-13, Subcontractor Cost or Pricing Data--
Modifications.

(End of clause)

22. *FAR 52.215-15 PENSION ADJUSTMENTS AND ASSET REVERSIONS (DEC 1998)

(a) The Contractor shall promptly notify the Contracting Officer in writing when it determines that it will terminate a defined-benefit pension plan or otherwise recapture such pension fund assets.

(b) For segment closings, pension plan terminations, or curtailment of benefits, the adjustment amount shall be the amount measured, assigned, and allocated in accordance with 48 CFR 9904.413-50(c)(12) for contracts and subcontracts that are subject to Cost Accounting Standards (CAS) Board rules and regulations (48 CFR Chapter 99). For contracts and subcontracts that are not subject to CAS, the adjustment amount shall be the amount measured, assigned, and allocated in accordance with 48 CFR 9904.413-50(c)(12), except the numerator of the fraction at 48 CFR 9904.413-50(c)(12)(vi) shall be the sum of the pension plan costs allocated to all non-CAS-covered contracts and subcontracts that are subject to Federal Acquisition Regulation (FAR) Subpart 31.2 or for which cost or pricing data were submitted.

(c) For all other situations where assets revert to the Contractor, or such assets are constructively received by it for any reason, the Contractor shall, at the Government's option, make a refund or give a credit to the Government for its equitable share of the gross amount withdrawn. The Government's equitable share shall reflect the Government's participation in pension costs through those contracts for which cost or pricing data were submitted or that are subject to FAR Subpart 31.2.

(d) The Contractor shall include the substance of this clause in all subcontracts under this contract that meet the applicability requirement of FAR 15.408(g).

(End of clause)

23. *FAR 52.215-16 FACILITIES CAPITAL COST OF MONEY (OCT 1997)

(a) Facilities capital cost of money will be an allowable cost under the contemplated contract, if the criteria for allowability in subparagraph 31.205-10(a)(2) of the Federal Acquisition Regulation are met. One of the allowability criteria requires the prospective contractor to propose facilities capital cost of money in its offer.

(b) If the prospective Contractor does not propose this cost, the resulting contract will include the clause Waiver of Facilities Capital Cost of Money.
(End of provision)

24. *FAR 52.215-17 WAIVER OF FACILITIES CAPITAL COST OF MONEY (OCT 1997)

The Contractor did not include facilities capital cost of money as a proposed cost of this contract. Therefore, it is an unallowable cost under this contract.
(End of clause)

25. *FAR 52.215-18 REVERSION OR ADJUSTMENT OF PLANS FOR POST RETIREMENT BENEFITS (PRB) OTHER THAN PENSIONS (OCT 1997)

The Contractor shall promptly notify the Contracting Officer in writing when it determines that it will terminate or reduce a PRB plan. If PRB fund assets revert, or inure, to the Contractor or are constructively received by it under a plan termination or otherwise, the Contractor shall make a refund or give a credit to the Government for its equitable share as required by FAR 31.205-6(o)(6). The Contractor shall include the substance of this clause in all subcontracts under this contract that meet the applicability requirements of FAR 15.408(j).

(End of clause)

26. *FAR 52.219-4 NOTICE OF PRICE EVALUATION PREFERENCE FOR HUBZONE SMALL BUSINESS CONCERNS (JAN 1999)

(a) *Definition.* "HUBZone small business concern," as used in this clause, means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration.

(b) *Evaluation preference.* (1) Offers will be evaluated by adding a factor of 10 percent to the price of all offers, except—

(i) Offers from HUBZone small business concerns that have not waived the evaluation preference;

(ii) Otherwise successful offers from small business concerns;

(iii) Otherwise successful offers of eligible products under the Trade Agreements Act when the dollar threshold for application of the Act is exceeded (see 25.402 of the Federal Acquisition Regulation (FAR)); and

(iv) Otherwise successful offers where application of the factor would be inconsistent with a Memorandum of Understanding or other international agreement with a foreign government.

(2) The factor of 10 percent shall be applied on a line item basis or to any group of items on which award may be made. Other evaluation factors described in the solicitation shall be applied before application of the factor.

(3) A concern that is both a HUBZone small business concern and a small disadvantaged business concern will receive the benefit of both the HUBZone small business price evaluation preference and the small disadvantaged business price evaluation adjustment (see FAR clause 52.219-23). Each applicable price evaluation

preference or adjustment shall be calculated independently against an offeror's base offer. These individual preference amounts shall be added together to arrive at the total evaluated price for that offer.

(c) *Waiver of evaluation preference.* A HUBZone small business concern may elect to waive the evaluation preference, in which case the factor will be added to its offer for evaluation purposes. The agreements in paragraph (d) of this clause do not apply if the offeror has waived the evaluation preference.

[] Offeror elects to waive the evaluation preference.

(d) *Agreement.* A HUBZone small business concern agrees that in the performance of the contract, in the case of a contract for—

(1) Services (except construction), at least 50 percent of the cost of personnel for contract performance will be spent for employees of the concern or employees of other HUBZone small business concerns;

(2) Supplies (other than procurement from a nonmanufacturer of such supplies), at least 50 percent of the cost of manufacturing, excluding the cost of materials, will be performed by the concern or other HUBZone small business concerns;

(3) General construction, at least 15 percent of the cost of the contract performance incurred for personnel will be spent on the concern's employees or the employees of other HUBZone small business concerns; or

(4) Construction by special trade contractors, at least 25 percent of the cost of the contract performance incurred for personnel will be spent on the concern's employees or the employees of other HUBZone small business concerns.

(e) A HUBZone joint venture agrees that in the performance of the contract, the applicable percentage specified in paragraph (d) of this clause will be performed by the HUBZone small business participant or participants.

(f) A HUBZone small business concern nonmanufacturer agrees to furnish in performing this contract only end items manufactured or produced by HUBZone small business manufacturer concerns. This paragraph does not apply in connection with construction or service contracts.

(End of clause)

27. *FAR 52.219-8

UTILIZATION OF SMALL BUSINESS CONCERNS (OCT 2000)

(a) It is the policy of the United States that small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns shall have the maximum practicable opportunity to participate in performing contracts let by any Federal agency, including contracts and subcontracts for subsystems, assemblies, components, and related services for major systems. It is further the policy of the United States that its prime contractors establish procedures to ensure the timely payment of amounts due pursuant to the terms of their subcontracts with small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns.

(b) The Contractor hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with efficient contract performance. The Contractor further agrees to cooperate in any studies or surveys as may be conducted by the United States Small Business Administration or the awarding agency of the United States as may be necessary to determine the extent of the Contractor's compliance with this clause.

(c) *Definitions.* As used in this contract—

“HUBZone small business concern” means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration.

“Service-disabled veteran-owned small business concern” —

(1) Means a small business concern—

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or

permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

“Small business concern” means a small business as defined pursuant to Section 3 of the Small Business Act and relevant regulations promulgated pursuant thereto.

“Small disadvantaged business concern” means a small business concern that represents, as part of its offer that—

(1) It has received certification as a small disadvantaged business concern consistent with 13 CFR part 124, Subpart B;

(2) No material change in disadvantaged ownership and control has occurred since its certification;

(3) Where the concern is owned by one or more individuals, the net worth of each individual upon whom the certification is based does not exceed \$750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); and

(4) It is identified, on the date of its representation, as a certified small disadvantaged business in the database maintained by the Small Business Administration (PRO-Net).

“Veteran-owned small business concern” means a small business concern—

(1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

“Women-owned small business concern” means a small business concern—

(1) That is at least 51 percent owned by one or more women, or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

(d) Contractors acting in good faith may rely on written representations by their subcontractors regarding their status as a small business concern, a veteran-owned small business concern, a service-disabled veteran-owned small business concern, a HUBZone small business concern, a small disadvantaged business concern, or a women-owned small business concern.

(End of clause)

28. *FAR 52.219-9 SMALL BUSINESS SUBCONTRACTING PLAN (JAN 2002) [When Contracting By Negotiations]

(a) This clause does not apply to small business concerns.

(b) *Definitions.* As used in this clause—

“Commercial item” means a product or service that satisfies the definition of commercial item in section 2.101 of the Federal Acquisition Regulation.

“Commercial plan” means a subcontracting plan (including goals) that covers the offeror’s fiscal year and that applies to the entire production of commercial items sold by either the entire company or a portion thereof (*e.g.*, division, plant, or product line).

“Individual contract plan” means a subcontracting plan that covers the entire contract period (including option periods), applies to a specific contract, and has goals that are based on the offeror’s planned subcontracting in support of the specific contract, except that indirect costs incurred for common or joint purposes may be allocated on a prorated basis to the contract.

“Master plan” means a subcontracting plan that contains all the required elements of an individual contract plan, except goals, and may be incorporated into individual contract plans, provided the master plan has been approved.

“Subcontract” means any agreement (other than one involving an employer-employee relationship) entered into by a Federal Government prime Contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

(c) The offeror, upon request by the Contracting Officer, shall submit and negotiate a subcontracting plan,

where applicable, that separately addresses subcontracting with small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business concerns, small disadvantaged business, and women-owned small business concerns. If the offeror is submitting an individual contract plan, the plan must separately address subcontracting with small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns, with a separate part for the basic contract and separate parts for each option (if any). The plan shall be included in and made a part of the resultant contract. The subcontracting plan shall be negotiated within the time specified by the Contracting Officer. Failure to submit and negotiate the subcontracting plan shall make the offeror ineligible for award of a contract.

(d) The offeror's subcontracting plan shall include the following:

(1) Goals, expressed in terms of percentages of total planned subcontracting dollars, for the use of small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns as subcontractors. The offeror shall include all subcontracts that contribute to contract performance, and may include a proportionate share of products and services that are normally allocated as indirect costs.

(2) A statement of—

(i) Total dollars planned to be subcontracted for an individual contract plan; or the offeror's total projected sales, expressed in dollars, and the total value of projected subcontracts to support the sales for a commercial plan;

(ii) Total dollars planned to be subcontracted to small business concerns;

(iii) Total dollars planned to be subcontracted to veteran-owned small business concerns;

(iv) Total dollars planned to be subcontracted to service-disabled veteran-owned small business;

(v) Total dollars planned to be subcontracted to HUBZone small business concerns;

(vi) Total dollars planned to be subcontracted to small disadvantaged business concerns; and

(vii) Total dollars planned to be subcontracted to women-owned small business concerns.

(3) A description of the principal types of supplies and services to be subcontracted, and an identification of the types planned for subcontracting to—

(i) Small business concerns;

(ii) Veteran-owned small business concerns;

(iii) Service-disabled veteran-owned small business concerns;

(iv) HUBZone small business concerns;

(v) Small disadvantaged business concerns; and

(vi) Women-owned small business concerns.

(4) A description of the method used to develop the subcontracting goals in paragraph (d)(1) of this clause.

(5) A description of the method used to identify potential sources for solicitation purposes (*e.g.*, existing company source lists, the Procurement Marketing and Access Network (PRO-Net) of the Small Business Administration (SBA), veterans service organizations, the National Minority Purchasing Council Vendor Information Service, the Research and Information Division of the Minority Business Development Agency in the Department of Commerce, or small, HUBZone, small disadvantaged, and women-owned small business trade associations). A firm may rely on the information contained in PRO-Net as an accurate representation of a concern's size and ownership characteristics for the purposes of maintaining a small, veteran-owned small, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small business source list. Use of PRONet as its source list does not relieve a firm of its responsibilities (*e.g.*, outreach, assistance, counseling, or publicizing subcontracting opportunities) in this clause.

(6) A statement as to whether or not the offeror included indirect costs in establishing subcontracting goals, and a description of the method used to determine the proportionate share of indirect costs to be incurred with—

(i) Small business concerns;

(ii) Veteran-owned small business concerns;

(iii) Service-disabled veteran-owned small business concerns;

(iv) HUBZone small business concerns;

- (v) Small disadvantaged business concerns; and
- (vi) Women-owned small business concerns.

(7) The name of the individual employed by the offeror who will administer the offeror's subcontracting program, and a description of the duties of the individual.

(8) A description of the efforts the offeror will make to assure that small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns have an equitable opportunity to compete for subcontracts.

(9) Assurances that the offeror will include the clause of this contract entitled "Utilization of Small Business Concerns" in all subcontracts that offer further subcontracting opportunities, and that the offeror will require all subcontractors (except small business concerns) that receive subcontracts in excess of \$500,000 (\$1,000,000 for construction of any public facility) to adopt a subcontracting plan that complies with the requirements of this clause.

(10) Assurances that the offeror will—

(i) Cooperate in any studies or surveys as may be required;

(ii) Submit periodic reports so that the Government can determine the extent of compliance by the offeror with the subcontracting plan;

(iii) Submit Standard Form (SF) 294, Subcontracting Report for Individual Contracts, and/or SF 295, Summary Subcontract Report, in accordance with paragraph (j) of this clause. The reports shall provide information on subcontract awards to small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, women-owned small business concerns, and Historically Black Colleges and Universities and Minority Institutions. Reporting shall be in accordance with the instructions on the forms or as provided in agency regulations.

(iv) Ensure that its subcontractors agree to submit SF 294 and SF 295.

(11) A description of the types of records that will be maintained concerning procedures that have been adopted to comply with the requirements and goals in the plan, including establishing source lists; and a description of the offeror's efforts to locate small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns and award subcontracts to them. The records shall include at least the following (on a plant-wide or company-wide basis, unless otherwise indicated):

(i) Source lists (e.g., PRO-Net), guides, and other data that identify small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns.

(ii) Organizations contacted in an attempt to locate sources that are small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, or women-owned small business concerns.

(iii) Records on each subcontract solicitation resulting in an award of more than \$100,000, indicating—

(A) Whether small business concerns were solicited and, if not, why not;

(B) Whether veteran-owned small business concerns were solicited and, if not, why not;

(C) Whether service-disabled veteran-owned small business concerns were solicited and, if not, why not;

(D) Whether HUBZone small business concerns were solicited and, if not, why not;

(E) Whether small disadvantaged business concerns were solicited and, if not, why not;

(F) Whether women-owned small business concerns were solicited and, if not, why not; and

(G) If applicable, the reason award was not made to a small business concern.

(iv) Records of any outreach efforts to contact—

(A) Trade associations;

(B) Business development organizations;

(C) Conferences and trade fairs to locate small, HUBZone small, small

disadvantaged, and women-owned small business sources; and

(D) Veterans service organizations.

(v) Records of internal guidance and encouragement provided to buyers through—

(A) Workshops, seminars, training, etc.; and

(B) Monitoring performance to evaluate compliance with the program's

requirements.

(vi) On a contract-by-contract basis, records to support award data submitted by the offeror to the Government, including the name, address, and business size of each subcontractor. Contractors having commercial plans need not comply with this requirement.

(e) In order to effectively implement this plan to the extent consistent with efficient contract performance, the Contractor shall perform the following functions:

(1) Assist small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation by such concerns. Where the Contractor's lists of potential small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business subcontractors are excessively long, reasonable effort shall be made to give all such small business concerns an opportunity to compete over a period of time.

(2) Provide adequate and timely consideration of the potentialities of small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns in all "make-or-buy" decisions.

(3) Counsel and discuss subcontracting opportunities with representatives of small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business firms.

(4) Provide notice to subcontractors concerning penalties and remedies for misrepresentations of business status as small, veteran-owned small business, HUBZone small, small disadvantaged, or women-owned small business for the purpose of obtaining a subcontract that is to be included as part or all of a goal contained in the Contractor's subcontracting plan.

(f) A master plan on a plant or division-wide basis that contains all the elements required by paragraph (d) of this clause, except goals, may be incorporated by reference as a part of the subcontracting plan required of the offeror by this clause; provided —

(1) The master plan has been approved;

(2) The offeror ensures that the master plan is updated as necessary and provides copies of the approved master plan, including evidence of its approval, to the Contracting Officer; and

(3) Goals and any deviations from the master plan deemed necessary by the Contracting Officer to satisfy the requirements of this contract are set forth in the individual subcontracting plan.

(g) A commercial plan is the preferred type of subcontracting plan for contractors furnishing commercial items. The commercial plan shall relate to the offeror's planned subcontracting generally, for both commercial and Government business, rather than solely to the Government contract. Commercial plans are also preferred for subcontractors that provide commercial items under a prime contract, whether or not the prime contractor is supplying a commercial item.

(h) Prior compliance of the offeror with other such subcontracting plans under previous contracts will be considered by the Contracting Officer in determining the responsibility of the offeror for award of the contract.

(i) The failure of the Contractor or subcontractor to comply in good faith with—

(1) The clause of this contract entitled "Utilization Of Small Business Concerns;" or

(2) An approved plan required by this clause, shall be a material breach of the contract.

(j) The Contractor shall submit the following reports:

(1) *Standard Form 294, Subcontracting Report for Individual Contracts*. This report shall be submitted to the Contracting Officer semiannually and at contract completion. The report covers subcontract award data related to this contract. This report is not required for commercial plans.

(2) *Standard Form 295, Summary Subcontract Report*. This report encompasses all of the contracts with the awarding agency. It must be submitted semi-annually for contracts with the Department of Defense and annually for contracts with civilian agencies. If the reporting activity is covered by a commercial plan, the reporting activity must report annually all subcontract awards under that plan. All reports submitted at the close

of each fiscal year (both individual and commercial plans) shall include a breakout, in the Contractor's format, of subcontract awards, in whole dollars, to small disadvantaged business concerns by North American Industry Classification System (NAICS) Industry Subsector. For a commercial plan, the Contractor may obtain from each of its subcontractors a predominant NAICS Industry Subsector and report all awards to that subcontractor under its predominant NAICS Industry Subsector.

(End of clause)

29. *FAR 52.219-16

LIQUIDATED DAMAGES-SUBCONTRACTING PLAN (JAN 1999)

(a) Failure to make a good faith effort to comply with the subcontracting plan, as used in this clause, means a willful or intentional failure to perform in accordance with the requirements of the subcontracting plan approved under the clause in this contract entitled "Small Business Subcontracting Plan," or willful or intentional action to frustrate the plan.

(b) Performance shall be measured by applying the percentage goals to the total actual subcontracting dollars or, if a commercial plan is involved, to the pro rata share of actual subcontracting dollars attributable to Government contracts covered by the commercial plan. If, at contract completion, or in the case of a commercial plan, at the close of the fiscal year for which the plan is applicable, the Contractor has failed to meet its subcontracting goals and the Contracting Officer decides in accordance with paragraph (c) of this clause that the Contractor failed to make a good faith effort to comply with its subcontracting plan, established in accordance with the clause in this contract entitled "Small Business Subcontracting Plan," the Contractor shall pay the Government liquidated damages in an amount stated. The amount of probable damages attributable to the Contractor's failure to comply shall be an amount equal to the actual dollar amount by which the Contractor failed to achieve each subcontract goal.

(c) Before the Contracting Officer makes a final decision that the Contractor has failed to make such good faith effort, the Contracting Officer shall give the Contractor written notice specifying the failure and permitting the Contractor to demonstrate what good faith efforts have been made and to discuss the matter. Failure to respond to the notice may be taken as an admission that no valid explanation exists. If, after consideration of all the pertinent data, the Contracting Officer finds that the Contractor failed to make a good faith effort to comply with the subcontracting plan, the Contracting Officer shall issue a final decision to that effect and require that the Contractor pay the Government liquidated damages as provided in paragraph (b) of this clause.

(d) With respect to commercial plans, the Contracting Officer who approved the plan will perform the functions of the Contracting Officer under this clause on behalf of all agencies with contracts covered by a commercial plan.

(e) The Contractor shall have the right of appeal, under the clause in this contract entitled, Disputes, from any final decision of the Contracting Officer.

(f) Liquidated damages shall be in addition to any other remedies that the Government may have.

30. DFARS 252.219-7003

SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN (DOD CONTRACTS) (APR 1996)

This clause supplements the Federal Acquisition Regulation 52.219-9, Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan, clause of this contract.

(a) Definitions.

"Historically black colleges and universities," as used in this clause, means institutions determined by the Secretary of Education to meet the requirements of 34 CFR Section 608.2. The term also means any nonprofit research institution that was an integral part of such a college or university before November 14, 1986.

"Minority institutions," as used in this clause, means institutions meeting the requirements of Section 1046(3) of the Higher Education Act of 1965 (20 U.S.C. 1135d-5(3)). The term also includes Hispanic-serving institutions as defined in Section 316(b)(1) of such Act (20 U.S.C. 1059c(b)(1)).

(b) Except for company or division-wide commercial products subcontracting plans, the term "small disadvantaged business," when used in the FAR 52.219-9 clause, includes historically black colleges and universities and minority institutions in addition to small disadvantaged business concerns.

(c) Work under the contract or its subcontracts shall be credited toward meeting the small disadvantaged business concern goal required by paragraph (d) of the FAR 52.219-9 clause when:

(1) It is performed on Indian lands or in joint venture with an Indian tribe or a tribally-owned corporation, and

(2) It meets the requirements of 10 U.S.C. 2323a.

(d) Subcontracts awarded to workshops approved by the Committee for Purchase from People Who are Blind or Severely Disabled (41 U.S.C. 46-48), may be counted toward the Contractor's small business subcontracting goal.

(e) A mentor firm, under the Pilot Mentor-Protege Program established under Section 831 of Pub. L. 101-510, as amended, may count toward its small disadvantaged business goal, subcontracts awarded--

(1) Protege firms which are qualified organizations employing the severely handicapped; and

(2) Former protege firms that meet the criteria in Section 831(g)(4) of Pub. L. 101-510.

(f) The master plan approval referred to in paragraph (f) of the FAR 52.219-9 clause is approval by the Contractor's cognizant contract administration activity.

(g) In those subcontracting plans which specifically identify small, small disadvantaged, and women-owned businesses, the Contractor shall notify the Administrative Contracting Officer of any substitutions of firms that are not small, small disadvantaged, or women-owned small businesses for the firms listed in the subcontracting plan. Notifications shall be in writing and shall occur within a reasonable period of time after award of the subcontract. Contractor-specified formats shall be acceptable.

31. DFARS 252.219-7004

SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN (TEST PROGRAM) (JUN 1997)

(a) Definition. "Subcontract," as used in this clause, means any agreement (other than one involving an employer-employee relationship) entered into by a Federal Government prime Contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

(b) The Offeror's comprehensive small business subcontracting plan and its successors, which are authorized by and approved under the test program of Section 834 of Pub. L. 101-189, shall be included in and made a part of the resultant contract. Upon expulsion from the test program or expiration of the test program, the Contractor shall negotiate an individual subcontracting plan for all future contracts that meet the requirements of Section 211 of Publ. L. 95-507.

(c) The Contractor shall submit Standard Form 295, Summary Subcontract Report, in accordance with the instructions on the form, except--

(1) One copy of SF 295 and attachments shall be submitted to Director, Small and Disadvantaged Business Utilization, Office of the Deputy Under Secretary of Defense (International and Commercial Programs), 3061 Defense Pentagon, Room 2A338, Washington, DC 20301-3061; and

(2) Item 14, Remarks, shall be completed to include semi-annual cumulative--

(1) Small business, small disadvantaged business and women-owned small business goals; and

(2) Small business and small disadvantaged business goals, actual accomplishments, and percentages for each of the two designated industry categories.

(d) The failure of the Contractor or subcontractor to comply in good faith with (1) the clause of this contract entitled "Utilization of Small, Small Disadvantaged and Women-Owned Small Business Concerns," or (2) an approved plan required by this clause, shall be a material breach of the contract.

32. DFARS 252.219-7009

SECTION 8(a) DIRECT AWARD (MAR 2002)

(a) This contract is issued as a direct award between the contracting office and the 8(a) Contractor pursuant to the Partnership Agreement dated February 1, 2002, between the Small Business Administration (SBA) and the Department of Defense. Accordingly, the SBA, even if not identified in Section A of this contract, is the prime contractor and retains responsibility for 8(a) certification, for 8(a) eligibility determinations and related issues, and for providing counseling and assistance to the 8(a) Contractor under the 8(a) Program. The cognizant SBA district office is:

[To be completed by the Contracting Officer at the time of award]

(b) The contracting office is responsible for administering the contract and for taking any action on behalf of the Government under the terms and conditions of the contract; provided that the contracting office shall give advance notice to the SBA before it issues a final notice terminating performance, either in whole or in part, under the contract. The contracting office also shall coordinate with the SBA prior to processing any novation agreement. The contracting office may assign contract administration functions to a contract administration office.

(c) The 8(a) Contractor agrees that--

(1) It will notify the Contracting Officer, simultaneous with its notification to the SBA (as required by SBA's 8(a) regulations at 13 CFR 124.308), when the owner or owners upon whom 8(a) eligibility is based plan to relinquish ownership or control of the concern. Consistent with Section 407 of Pub. L. 100-656, transfer of ownership or control shall result in termination of the contract for convenience, unless the SBA waives the requirement for termination prior to the actual relinquishing of ownership and control; and

(2) It will not subcontract the performance of any of the requirements of this contract without the prior written approval of the SBA and the Contracting Officer.

(End of clause)

33. DFARS 252.219-7010 ALTERNATE A (JUN 1998)
[When Competitive 8(a) Contracting Procedures are used]

As prescribed in 219.811-3(2), substitute the following paragraph (c) for paragraph (c) of the clause at FAR 52.219-18:

(c) Any award resulting from this solicitation will be made directly by the Contracting Officer to the successful 8(a) offeror selected through the evaluation criteria set forth in this solicitation.

34. *FAR 52.222-1 NOTICE TO THE GOVERNMENT OF LABOR DISPUTES (FEB 1997)

If the Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this contract, the Contractor shall immediately give notice, including all relevant information, to the Contracting Officer. (End of clause)

35. *FAR 52.222-3

CONVICT LABOR (AUG 1996)

The Contractor agrees not to employ in the performance of this contract any person undergoing a sentence of imprisonment which has been imposed by any court of a State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or the Trust Territory of the Pacific Islands. This limitation, however, shall not prohibit the employment by the Contractor in the performance of this contract of persons on parole or probation to work at paid employment during the term of their sentence or persons who have been pardoned or who have served their terms. Nor shall it prohibit the employment by the Contractor in the performance of this contract of persons confined for violation of the laws of any of the States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or the Trust Territory of the Pacific Islands who are authorized to work at paid employment in the community under the laws of such jurisdiction, if--

- (a) (1) The worker is paid or is in an approved work training program on a voluntary basis;
- (2) Representatives of local union central bodies or similar labor union organizations have been consulted;
- (3) Such paid employment will not result in the displacement of employed workers, or be applied in skills, crafts, or trades in which there is a surplus of available gainful labor in the locality, or impair existing contracts for services; and
- (4) The rates of pay and other conditions of employment will not be less than those paid or provided for work of a similar nature in the locality in which the work is being performed; and
- (b) The Attorney General of the United States has certified that the work-release laws or regulations of the jurisdiction involved are in conformity with the requirements of Executive Order 11755, as amended by Executive Orders 12608 and 12943.

36. *FAR 52.222-4

**CONTRACT WORK HOURS AND SAFETY STANDARDS ACT—
OVERTIME COMPENSATION (SEPT 2000)**

(a) *Overtime requirements.* No Contractor or subcontractor employing laborers or mechanics (see Federal Acquisition Regulation 22.300) shall require or permit them to work over 40 hours in any workweek unless they are paid at least 1 and 1/2 times the basic rate of pay for each hour worked over 40 hours.

(b) *Violation; liability for unpaid wages; liquidated damages.* The responsible Contractor and subcontractor are liable for unpaid wages if they violate the terms in paragraph (a) of this clause. In addition, the Contractor and subcontractor are liable for liquidated damages payable to the Government. The Contracting Officer will assess liquidated damages at the rate of \$10 per affected employee for each calendar day on which the employer required or permitted the employee to work in excess of the standard workweek of 40 hours without paying overtime wages required by the Contract Work Hours and Safety Standards Act.

(c) *Withholding for unpaid wages and liquidated damages.* The Contracting Officer will withhold from payments due under the contract sufficient funds required to satisfy any Contractor or subcontractor liabilities for unpaid wages and liquidated damages. If amounts withheld under the contract are insufficient to satisfy Contractor or subcontractor liabilities, the Contracting Officer will withhold payments from other Federal or Federally assisted contracts held by the same Contractor that are subject to the Contract Work Hours and Safety Standards Act.

(d) *Payrolls and basic records.* (1) The Contractor and its subcontractors shall maintain payrolls and basic payroll records for all laborers and mechanics working on the contract during the contract and shall make them available to the Government until 3 years after contract completion. The records shall contain the name and address of each employee, social security number, labor classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. The records need not duplicate those required for construction work by Department of Labor regulations at 29 CFR 5.5(a)(3) implementing the Davis-Bacon Act .

(2) The Contractor and its subcontractors shall allow authorized representatives of the Contracting Officer or the Department of Labor to inspect, copy, or transcribe records maintained under paragraph (d)(1) of this clause. The Contractor or subcontractor also shall allow authorized representatives of the Contracting Officer or Department of Labor to interview employees in the workplace during working hours.

(e) *Subcontracts.* The Contractor shall insert the provisions set forth in paragraphs (a) through (d) of this clause in subcontracts exceeding \$100,000 and require subcontractors to include these provisions in any lower-tier subcontracts. The Contractor shall be responsible for compliance by any subcontractor or lower-tier subcontractor with the provisions set forth in paragraphs (a) through (d) of this clause.

(End of clause)

(a) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (d) of this clause; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such period. Such laborers and mechanics shall be paid not less than the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in the clause entitled Apprentices and Trainees. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph (b) of this clause) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(b) (1) The Contracting Officer shall require that any class of laborers or mechanics, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The Contracting Officer shall approve an additional classification and wage rate and fringe benefits therefor only when all the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination.

(ii) The classification is utilized in the area by the construction industry.

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the Contractor and laborers and mechanics to be employed in the classification (if known), or their representatives, and the Contracting Officer agree on the classification and wage rate (including the amount designated for fringe benefits, where appropriate), a report of the action taken shall be sent by the Contracting Officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator or an authorized representative will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.

(3) In the event the Contractor, the laborers or mechanics to be employed in the classification, or their representatives, and the Contracting Officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Contracting Officer shall refer the questions, including the views of all interested parties and the recommendation of the Contracting Officer, to the Administrator of the Wage and Hour Division for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits, where appropriate) determined pursuant to subparagraphs (b)(2) and (b)(3) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(c) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(d) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program; provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of

Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

38. *FAR 52.222-7

WITHHOLDING OF FUNDS (FEB 1988)

The Contracting Officer shall, upon his or her own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same Prime Contractor, or any other Federally assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same Prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

39. *FAR 52.222-8

PAYROLLS AND BASIC RECORDS (FEB 1988)

(a) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of 3 years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under paragraph (d) of the clause entitled Davis-Bacon Act, that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(b) (1) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under paragraph (a) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. The Prime Contractor is responsible for the submission of copies of payrolls by all subcontractors.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify--

(i) That the payroll for the payroll period contains the information required to be maintained under paragraph (a) of this clause and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR Part 3; and

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph (b)(2) of this clause.

(4) The falsification of any of the certifications in this clause may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

(c) The Contractor or subcontractor shall make the records required under paragraph (a) of this clause available for inspection, copying, or transcription by the Contracting Officer or authorized representatives of the Contracting Officer or the Department of Labor. The Contractor or subcontractor shall permit the Contracting Officer or representatives of the Contracting Officer or the Department of Labor to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit required records or to make them available, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

40. *FAR 52.222-9

APPRENTICES AND TRAINEES (FEB 1988)

(a) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will not longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(b) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the

corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(c) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

41. *FAR 52.222-10 COMPLIANCE WITH COPELAND ACT REQUIREMENTS (FEB 1988)

The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.

42. *FAR 52.222-11 SUBCONTRACTS (LABOR STANDARDS) (FEB 1988)

(a) The Contractor or subcontractor shall insert in any subcontracts the clauses entitled Davis-Bacon Act, Contract Work Hours and Safety Standards Act--Overtime Compensation, Apprentices and Trainees, Payrolls and Basic Records, Compliance with Copeland Act Requirements, Withholding of Funds, Subcontracts (Labor Standards), Contract Termination--Debarment, Disputes Concerning Labor Standards, Compliance with Davis-Bacon and Related Act Regulations, and Certification of Eligibility, and such other clauses as the Contracting Officer may, by appropriate instructions, require, and also a clause requiring subcontractors to include these clauses in any lower tier subcontracts. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with all the contract clauses cited in this paragraph.

(b) (1) Within 14 days after award of the contract, the Contractor shall deliver to the Contracting Officer a completed Statement and Acknowledgment Form (SF 1413) for each subcontract, including the subcontractor's signed and dated acknowledgment that the clauses set forth in paragraph (a) of this clause have been included in the subcontract.

(2) Within 14 days after the award of any subsequently awarded subcontract the Contractor shall deliver to the Contracting Officer an updated completed SF 1413 for such additional subcontract.

43. *FAR 52.222-12 CONTRACT TERMINATION--DEBARMENT (FEB 1988)

A breach of the contract clauses entitled Davis-Bacon Act, Contract Work Hours and Safety Standards Act--Overtime Compensation, Apprentices and Trainees, Payrolls and Basic Records, Compliance with Copeland Act Requirements, Subcontracts (Labor Standards), Compliance with Davis-Bacon and Related Act Regulations, or Certification of Eligibility may be grounds for termination of the contract, and for debarment as a Contractor and subcontractor as provided in 29 CFR 5.12.

44. *FAR 52.222-13 COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REGULATIONS (FEB 1988)

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are hereby incorporated by reference in this contract.

45. *FAR 52.222-14 DISPUTES CONCERNING LABOR STANDARDS (FEB 1988)

The United States Department of Labor has set forth in 29 CFR Parts 5, 6, and 7 procedures for resolving disputes concerning labor standards requirements. Such disputes shall be resolved in accordance with those procedures and not the Disputes clause of this contract. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency the U.S. Department of Labor, or the employees of their representatives.

46. *FAR 52.222-15 CERTIFICATION OF ELIGIBILITY (FEB 1988)

(a) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(b) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(c) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

47. *FAR 52.222-26 EQUAL OPPORTUNITY (APR 2002)

(a) *Definition.* "United States," as used in this clause, means the 50 States, the District of Columbia, Puerto Rico, the Northern Mariana Islands, American Samoa, Guam, the U.S. Virgin Islands, and Wake Island.

(b) If, during any 12-month period (including the 12 months preceding the award of this contract), the Contractor has been or is awarded nonexempt Federal contracts and/or subcontracts that have an aggregate value in excess of \$10,000, the Contractor shall comply with paragraphs (b)(1) through (b)(11) of this clause, except for work performed outside the United States by employees who were not recruited within the United States. Upon request, the Contractor shall provide information necessary to determine the applicability of this clause.

(1) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. However, it shall not be a violation of this clause for the Contractor to extend a publicly announced preference in employment to Indians living on or near an Indian reservation, in connection with employment opportunities on or near an Indian reservation, as permitted by 41 CFR 60-1.5.

(2) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. This shall include, but not be limited to—

- (i) Employment;
- (ii) Upgrading;
- (iii) Demotion;
- (iv) Transfer;
- (v) Recruitment or recruitment advertising;
- (vi) Layoff or termination;
- (vii) Rates of pay or other forms of compensation; and
- (viii) Selection for training, including apprenticeship.

(3) The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.

(4) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(5) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

(6) The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

(7) The Contractor shall furnish to the contracting agency all information required by Executive Order 11246, as amended, and by the rules, regulations, and orders of the Secretary of Labor. The Contractor shall also file Standard Form 100 (EEO-1), or any successor form, as prescribed in 41 CFR part 60-1. Unless the Contractor has filed within the 12 months preceding the date of contract award, the Contractor shall, within 30 days after contract award, apply to either the regional Office of Federal Contract Compliance Programs (OFCCP) or the local office of the Equal Employment Opportunity Commission for the necessary forms.

(8) The Contractor shall permit access to its premises, during normal business hours, by the contracting agency or the OFCCP for the purpose of conducting on-site compliance evaluations and complaint investigations. The Contractor shall permit the Government to inspect and copy any books, accounts, records (including computerized records), and other material that may be relevant to the matter under investigation and pertinent to compliance with Executive Order 11246, as amended, and rules and regulations that implement the Executive Order.

(9) If the OFCCP determines that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts, under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended; in the rules, regulations, and orders of the Secretary of Labor; or as otherwise provided by law.

(10) The Contractor shall include the terms and conditions of paragraphs (b)(1) through (11) of this clause in every subcontract or purchase order that is not exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor.

(11) The Contractor shall take such action with respect to any subcontract or purchase order as the Contracting Officer may direct as a means of enforcing these terms and conditions, including sanctions for noncompliance, provided, that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of any direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

(c) Notwithstanding any other clause in this contract, disputes relative to this clause will be governed by the procedures in 41 CFR 60-1.1.

(End of clause)

48. *FAR 52.222-27 AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS FOR CONSTRUCTION (FEB 1999)

(a) Definitions.

"Covered area," as used in this clause, means the geographical area described in the solicitation for this contract.

"Deputy Assistant Secretary," as used in this clause, means the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, or a designee

"Employer's identification number," as used in this clause, means the Federal Social Security number used on the employer's quarterly Federal tax return, U.S. Treasury Department Form 941.

"Minority," as used in this clause, means--

(1) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

(2) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands);

(3) Black (all persons having origins in any of the black African racial groups not of Hispanic origin); and

(4) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race).

(b) If the Contractor, or a subcontractor at any tier, subcontracts a portion of the work involving any construction trade each such subcontract in excess of \$10,000 shall include this clause and the Notice containing the goals for minority and female participation stated in the solicitation for this contract.

(c) If the Contractor is participating in a Hometown Plan (41 CFR 60-4) approved by the U.S. Department of Labor in a covered area, either individually or through an association, its affirmative action obligations on all work in the plan area (including goals) shall comply with the plan for those trades that have unions participating in the plan. Contractors must be able to demonstrate participation in, and compliance with, the provisions of the plan. Each Contractor or subcontractor participating in an approved plan is also required to comply with its obligations under the Equal Opportunity clause, and to make a good faith effort to achieve each goal under the plan in each trade in which it has employees. The overall good-faith performance by other Contractors or subcontractors toward a goal in an approved plan does not excuse any Contractor's or subcontractor's failure to make good-faith efforts to achieve the plan's goals.

(d) The Contractor shall implement the affirmative action procedures in subparagraphs (g)(1) through (16) of this clause. The goals stated in the solicitation for this contract are expressed as percentages of the total hours of employment and training of minority and female utilization that the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for the geographical area where that work is actually performed. The Contractor is expected to make substantially uniform progress toward its goals in each craft.

(e) Neither the terms and conditions of any collective bargaining agreement, nor the failure by a union with which the Contractor has a collective bargaining agreement, to refer minorities or women shall excuse the Contractor's obligations under this clause, Executive Order 11246, as amended, or the regulations thereunder.

(f) In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

(g) The Contractor shall take affirmative action to ensure equal employment opportunity. The evaluation of the Contractor's compliance with this clause shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and implement affirmative action steps at least as extensive as the following:

(1) Ensure a working environment free of harassment, intimidation, and coercion at all sites and in all facilities where the Contractor's employees are assigned to work. The Contractor, if possible, will assign two or more women to each construction project. The Contractor shall ensure that foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at these sites or facilities.

(2) Establish and maintain a current list of sources for minority and female recruitment. Provide written notification to minority and female recruitment sources and community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

(3) Establish and maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant, referrals of minorities or females from unions, recruitment sources, or community organizations, and the action taken with respect to each individual. If an individual was sent to the union hiring hall for referral and not referred back to the Contractor by the union or, if referred back, not employed by the Contractor, this shall be documented in the file, along with whatever additional actions the Contractor may have taken.

(4) Immediately notify the Deputy Assistant Secretary when the union or unions with which the Contractor has a collective bargaining agreement has not referred back to the Contractor a minority or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

(5) Develop on-the-job training opportunities and/or participate in training programs for the area that expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the

Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under subparagraph (g)(2) of this clause.

- (6) Disseminate the Contractor's equal employment policy by--
 - (i) Providing notice of the policy to unions and to training, recruitment, and outreach programs, and requesting their cooperation in assisting the Contractor in meeting its contract obligations;
 - (ii) Including the policy in any policy manual and in collective bargaining agreements;
 - (iii) Publicizing the policy in the company newspaper, annual report, etc.;
 - (iv) Reviewing the policy with all management personnel and with all minority and female employees at least once a year; and
 - (v) Posting the policy on bulletin boards accessible to employees at each location where construction work is performed.
- (7) Review, at least annually, the Contractor's equal employment policy and affirmative action obligations with all employees having responsibility for hiring, assignment, layoff, termination, or other employment decisions. Conduct review of this policy with all on-site supervisory personnel before initiating construction work at a job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- (8) Disseminate the Contractor's equal employment policy externally by including it in any advertising in the news media, specifically including minority and female news media. Provide written notification to, and discuss this policy with, other Contractors and subcontractors with which the Contractor does or anticipates doing business.
- (9) Direct recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students, and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than 1 month before the date for acceptance of applications for apprenticeship or training by any recruitment source, send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- (10) Encourage present minority and female employees to recruit minority persons and women. Where reasonable, provide after-school, summer, and vacation employment to minority and female youth both on the site and in other areas of the Contractor's workforce.
- (11) Validate all tests and other selection requirements where required under 41 CFR 60-3.
- (12) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities. Encourage these employees to seek or to prepare for, through appropriate training, etc., opportunities for promotion.
- (13) Ensure that seniority practices job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment-related activities to ensure that the Contractor's obligations under this contract are being carried out.
- (14) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- (15) Maintain a record of solicitations for subcontracts for minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
- (16) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's equal employment policy and affirmative action obligations.
- (h) The Contractor is encouraged to participate in voluntary associations that may assist in fulfilling one or more of the affirmative action obligations contained in subparagraphs (g)(1) through (16) of this clause. The efforts of a contractor association, joint contractor-union, contractor-community, or similar group of which the contractor is a member and participant may be asserted as fulfilling one or more of its obligations under subparagraphs (g)(1) through (16) of this clause, provided the Contractor--
 - (1) Actively participates in the group;
 - (2) Makes every effort to ensure that the group has a positive impact on the employment of minorities and women in the industry;
 - (3) Ensures that concrete benefits of the program are reflected in the Contractor's minority and female workforce participation;

- (4) Makes a good-faith effort to meet its individual goals and timetables; and
- (5) Can provide access to documentation that demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply is the Contractor's, and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
- (i) A single goal for minorities and a separate single goal for women shall be established. The Contractor is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and nonminority. Consequently, the Contractor may be in violation of Executive Order 11246, as amended, if a particular group is employed in a substantially disparate manner.
- (j) The Contractor shall not use goals or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
- (k) The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts under Executive Order 11246, as amended.
- (l) The Contractor shall carry out such sanctions and penalties for violation of this clause and of the Equal Opportunity clause, including suspension, termination, and cancellation of existing subcontracts, as may be imposed or ordered under Executive Order 11246, as amended, and its implementing regulations, by the OFCCP. Any failure to carry out these sanctions and penalties as ordered shall be a violation of this clause and Executive Order 11246, as amended.
- (m) The Contractor in fulfilling its obligations under this clause shall implement affirmative action procedures at least as extensive as those prescribed in paragraph (g) of this clause, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of Executive Order 11246, as amended, the implementing regulations, or this clause, the Deputy Assistant Secretary shall take action as prescribed in 41 CFR 60-4.8.
- (n) The Contractor shall designate a responsible official to--
 - (1) Monitor all employment-related activity to ensure that the Contractor's equal employment policy is being carried out;
 - (2) Submit reports as may be required by the Government; and
 - (3) Keep records that shall at least include for each employee the name, address, telephone number, construction trade, union affiliation (if any), employee identification number, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, separate records are not required to be maintained.
- (o) Nothing contained herein shall be construed as a limitation upon the application of other laws that establish different standards of compliance or upon the requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

49. *FAR 52.222-35 EQUAL OPPORTUNITY FOR SPECIAL DISABLED VETERANS, VETERANS OF THE VIETNAM ERA, AND OTHER ELIGIBLE VETERANS (DEC 2001)

- (a) *Definitions.* As used in this clause—
 - “All employment openings” means all positions except executive and top management, those positions that will be filled from within the Contractor's organization, and positions lasting 3 days or less. This term includes full-time employment, temporary employment of more than 3 days duration, and part-time employment.
 - “Executive and top management” means any employee—
 - (1) Whose primary duty consists of the management of the enterprise in which the individual is employed or of a customarily recognized department or subdivision thereof;
 - (2) Who customarily and regularly directs the work of two or more other employees;
 - (3) Who has the authority to hire or fire other employees or whose suggestions and recommendations as to the hiring or firing and as to the advancement and promotion or any other change of status of other employees will be given particular weight;
 - (4) Who customarily and regularly exercises discretionary powers; and

(5) Who does not devote more than 20 percent or, in the case of an employee of a retail or service establishment, who does not devote more than 40 percent of total hours of work in the work week to activities that are not directly and closely related to the performance of the work described in paragraphs (1) through (4) of this definition. This paragraph (5) does not apply in the case of an employee who is in sole charge of an establishment or a physically separated branch establishment, or who owns at least a 20 percent interest in the enterprise in which the individual is employed.

“Other eligible veteran” means any other veteran who served on active duty during a war or in a campaign or expedition for which a campaign badge has been authorized.

“Positions that will be filled from within the Contractor's organization” means employment openings for which the Contractor will give no consideration to persons outside the Contractor's organization (including any affiliates, subsidiaries, and parent companies) and includes any openings the Contractor proposes to fill from regularly established “recall” lists. The exception does not apply to a particular opening once an employer decides to consider applicants outside of its organization.

“Qualified special disabled veteran” means a special disabled veteran who satisfies the requisite skill, experience, education, and other job-related requirements of the employment position such veteran holds or desires, and who, with or without reasonable accommodation, can perform the essential functions of such position.

“Special disabled veteran” means—

(1) A veteran who is entitled to compensation (or who but for the receipt of military retired pay would be entitled to compensation) under laws administered by the Department of Veterans Affairs for a disability—

(i) Rated at 30 percent or more; or

(ii) Rated at 10 or 20 percent in the case of a veteran who has been determined under 38 U.S.C. 3106 to have a serious employment handicap (*i.e.*, a significant impairment of the veteran's ability to prepare for, obtain, or retain employment consistent with the veteran's abilities, aptitudes, and interests); or

(2) A person who was discharged or released from active duty because of a service-connected disability.

“Veteran of the Vietnam era” means a person who—

(1) Served on active duty for a period of more than 180 days and was discharged or released from active duty with other than a dishonorable discharge, if any part of such active duty occurred—

(i) In the Republic of Vietnam between February 28, 1961, and May 7, 1975; or

(ii) Between August 5, 1964, and May 7, 1975, in all other cases; or

(2) Was discharged or released from active duty for a service-connected disability if any part of the active duty was performed—

(i) In the Republic of Vietnam between February 28, 1961, and May 7, 1975; or

(ii) Between August 5, 1964, and May 7, 1975, in all other cases.

(b) *General.* (1) The Contractor shall not discriminate against the individual because the individual is a special disabled veteran, a veteran of the Vietnam era, or other eligible veteran, regarding any position for which the employee or applicant for employment is qualified. The Contractor shall take affirmative action to employ, advance in employment, and otherwise treat qualified special disabled veterans, veterans of the Vietnam era, and other eligible veterans without discrimination based upon their disability or veterans' status in all employment practices such as—

(i) Recruitment, advertising, and job application procedures;

(ii) Hiring, upgrading, promotion, award of tenure, demotion, transfer, layoff, termination, right of return from layoff and rehiring;

(iii) Rate of pay or any other form of compensation and changes in compensation;

(iv) Job assignments, job classifications, organizational structures, position descriptions, lines of progression, and seniority lists;

(v) Leaves of absence, sick leave, or any other leave;

(vi) Fringe benefits available by virtue of employment, whether or not administered by the Contractor;

(vii) Selection and financial support for training, including apprenticeship, and on-the-job training under 38 U.S.C. 3687, professional meetings, conferences, and other related activities, and selection for leaves of absence to pursue training;

(viii) Activities sponsored by the Contractor including social or recreational programs;

and

(ix) Any other term, condition, or privilege of employment.

(2) The Contractor shall comply with the rules, regulations, and relevant orders of the Secretary of Labor issued under the Vietnam Era Veterans' Readjustment Assistance Act of 1972 (the Act), as amended (38 U.S.C. 4211 and 4212).

(c) *Listing openings.* (1) The Contractor shall immediately list all employment openings that exist at the time of the execution of this contract and those which occur during the performance of this contract, including those not generated by this contract, and including those occurring at an establishment of the Contractor other than the one where the contract is being performed, but excluding those of independently operated corporate affiliates, at an appropriate local public employment service office of the State wherein the opening occurs. Listing employment openings with the U.S. Department of Labor's America's Job Bank shall satisfy the requirement to list jobs with the local employment service office.

(2) The Contractor shall make the listing of employment openings with the local employment service office at least concurrently with using any other recruitment source or effort and shall involve the normal obligations of placing a bona fide job order, including accepting referrals of veterans and nonveterans. This listing of employment openings does not require hiring any particular job applicant or hiring from any particular group of job applicants and is not intended to relieve the Contractor from any requirements of Executive orders or regulations concerning nondiscrimination in employment.

(3) Whenever the Contractor becomes contractually bound to the listing terms of this clause, it shall advise the State public employment agency in each State where it has establishments of the name and location of each hiring location in the State. As long as the Contractor is contractually bound to these terms and has so advised the State agency, it need not advise the State agency of subsequent contracts. The Contractor may advise the State agency when it is no longer bound by this contract clause.

(d) *Applicability.* This clause does not apply to the listing of employment openings that occur and are filled outside the 50 States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, American Samoa, Guam, the Virgin Islands of the United States, and Wake Island.

(e) *Postings.* (1) The Contractor shall post employment notices in conspicuous places that are available to employees and applicants for employment.

(2) The employment notices shall—

(i) State the rights of applicants and employees as well as the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified employees and applicants who are special disabled veterans, veterans of the Vietnam era, and other eligible veterans; and

(ii) Be in a form prescribed by the Deputy Assistant Secretary for Federal Contract Compliance Programs, Department of Labor (Deputy Assistant Secretary of Labor), and provided by or through the Contracting Officer.

(3) The Contractor shall ensure that applicants or employees who are special disabled veterans are informed of the contents of the notice (e.g., the Contractor may have the notice read to a visually disabled veteran, or may lower the posted notice so that it can be read by a person in a wheelchair).

(4) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement, or other contract understanding, that the Contractor is bound by the terms of the Act and is committed to take affirmative action to employ, and advance in employment, qualified special disabled veterans, veterans of the Vietnam era, and other eligible veterans.

(f) *Noncompliance.* If the Contractor does not comply with the requirements of this clause, the Government may take appropriate actions under the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

(g) *Subcontracts.* The Contractor shall insert the terms of this clause in all subcontracts or purchase orders of \$25,000 or more unless exempted by rules, regulations, or orders of the Secretary of Labor. The Contractor shall act as specified by the Deputy Assistant Secretary of Labor to enforce the terms, including action for noncompliance.

(End of clause)

50. *FAR 52.222-36 AFFIRMATIVE ACTION FOR WORKERS WITH DISABILITIES (JUN 1998)

(a) General.

(1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against any employee or applicant because of physical or mental disability. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified individuals with disabilities without discrimination based upon their physical or mental disability in all employment practices such as--

- (i) Recruitment, advertising, and job application procedures;
- (ii) Hiring, upgrading, promotion, award of tenure, demotion, transfer, layoff, termination, right of return from layoff, and rehiring;
- (iii) Rates of pay or other forms of compensation and changes in compensation;
- (iv) Job assignments, job classifications, organizational structures, position descriptions, lines of progression, and seniority lists;
- (v) Leaves of absence, sick leave, or any other leave;
- (vi) Fringe benefits available by virtue of employment, whether or not administered by the Contractor;
- (vii) Selection and financial support for training, including apprenticeships, professional meetings, conferences, and other related activities, and selection for leaves of absence to pursue training;
- (viii) Activities sponsored by the Contractor, including social or recreational programs; and
- (ix) Any other term, condition, or privilege of employment.

(2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Rehabilitation Act of 1973 (29 U.S.C. 793) (the Act), as amended.

(b) Postings.

- (1) The Contractor agrees to post employment notices stating--
 - (i) The Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified individuals with disabilities; and
 - (ii) The rights of applicants and employees.
- (2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. The Contractor shall ensure that applicants and employees with disabilities are informed of the contents of the notice (e.g., the Contractor may have the notice read to visually disabled individual, or may lower the posted notice so that it might be read by a person in a wheelchair). The notices shall be in a form prescribed by the Deputy Assistant Secretary for Federal Contract Compliance of the U.S. Department of Labor (Deputy Assistant Secretary) and shall be provided by or through the Contracting Officer.
- (3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Act and is committed to take affirmative action to employ, and advance in employment, qualified individuals with physical or mental disabilities.
- (c) Noncompliance. If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations, and relevant orders of the Secretary issued pursuant to the Act.
- (b) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order in excess of \$10,000 unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Deputy Assistant Secretary to enforce the terms, including action for noncompliance.

51. *FAR 52.222-37 EMPLOYMENT REPORTS ON SPECIAL DISABLED VETERANS, VETERANS OF THE VIETNAM ERA, AND OTHER ELIGIBLE VETERANS (DEC 2001)

(a) Unless the Contractor is a State or local government agency, the Contractor shall report at least annually, as required by the Secretary of Labor, on—

(1) The number of special disabled veterans, the number of veterans of the Vietnam era, and other eligible veterans in the workforce of the Contractor by job category and hiring location; and

(2) The total number of new employees hired during the period covered by the report, and of the total, the number of special disabled veterans, the number of veterans of the Vietnam era, and the number of other eligible veterans; and

(3) The maximum number and the minimum number of employees of the Contractor during the period covered by the report.

(b) The Contractor shall report the above items by completing the Form VETS-100, entitled "Federal Contractor Veterans' Employment Report (VETS-100 Report)".

(c) The Contractor shall submit VETS-100 Reports no later than September 30 of each year beginning September 30, 1988.

(d) The employment activity report required by paragraph (a)(2) of this clause shall reflect total hires during the most recent 12-month period as of the ending date selected for the employment profile report required by paragraph (a)(1) of this clause. Contractors may select an ending date—

(1) As of the end of any pay period between July 1 and August 31 of the year the report is due; or

(2) As of December 31, if the Contractor has prior written approval from the Equal Employment Opportunity Commission to do so for purposes of submitting the Employer Information Report EEO-1 (Standard Form 100).

(e) The Contractor shall base the count of veterans reported according to paragraph (a) of this clause on voluntary disclosure. Each Contractor subject to the reporting requirements at 38 U.S.C. 4212 shall invite all special disabled veterans, veterans of the Vietnam era, and other eligible veterans who wish to benefit under the affirmative action program at 38 U.S.C. 4212 to identify themselves to the Contractor. The invitation shall state that—

(1) The information is voluntarily provided;

(2) The information will be kept confidential;

(3) Disclosure or refusal to provide the information will not subject the applicant or employee to any adverse treatment; and

(4) The information will be used only in accordance with the regulations promulgated under 38 U.S.C. 4212.

(f) The Contractor shall insert the terms of this clause in all subcontracts or purchase orders of \$25,000 or more unless exempted by rules, regulations, or orders of the Secretary of Labor.

(End of clause)

52. *FAR 52.222-38 COMPLIANCE WITH VETERANS' EMPLOYMENT REPORTING REQUIREMENTS (DEC 2001)

By submission of its offer, the offeror represents that, if it is subject to the reporting requirements of 38 U.S.C. 4212(d) (*i.e.*, if it has any contract containing Federal Acquisition Regulation clause 52.222-37, Employment Reports on Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans), it has submitted the most recent VETS-100 Report required by that clause.

(End of provision)

53. *FAR 52.223-3 HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA (JAN 1997)

(a) "Hazardous material," as used in this clause, includes any material defined as hazardous under the latest version of Federal Standard No. 313 (including revisions adopted during the term of the contract).

(b) The offeror must list any hazardous material, as defined in paragraph (a) of this clause, to be delivered under this contract. The hazardous material shall be properly identified and include any applicable identification number, such as National Stock Number or Special Item Number. This information shall also be included on the Material Safety Data Sheet submitted under this contract.

Material

Identification No.

(If none, insert "None")

_____	_____
_____	_____
_____	_____

(c) This list must be updated during performance of the contract whenever the Contractor determines that any other material to be delivered under this contract is hazardous.

(d) The apparently successful offeror agrees to submit, for each item as required prior to award, a Material Safety Data Sheet, meeting the requirements of 29 CFR 1910.1200(g) and the latest version of Federal Standard No. 313, for all hazardous material identified in paragraph (b) of this clause. Data shall be submitted in accordance with Federal Standard No. 313, whether or not the apparently successful offeror is the actual manufacturer of these items. Failure to submit the Material Safety Data Sheet prior to award may result in the apparently successful offeror being considered nonresponsible and ineligible for award.

(e) If, after award, there is a change in the composition of the item(s) or a revision to Federal Standard No. 313, which renders incomplete or inaccurate the data submitted under paragraph (d) of this clause, the Contractor shall promptly notify the Contracting Officer and resubmit the data.

(f) Neither the requirements of this clause nor any act or failure to act by the Government shall relieve the Contractor of any responsibility or liability for the safety of Government, Contractor, or subcontractor personnel or property.

(g) Nothing contained in this clause shall relieve the Contractor from complying with applicable Federal, State, and local laws, codes, ordinances, and regulations (including the obtaining of licenses and permits) in connection with hazardous material.

(h) The Government's rights in data furnished under this contract with respect to hazardous material are as follows:

(1) To use, duplicate and disclose any data to which this clause is applicable. The purposes of this right are to--

- (i) Apprise personnel of the hazards to which they may be exposed in using, handling, packaging, transporting, or disposing of hazardous materials;
- (ii) Obtain medical treatment for those affected by the material; and
- (iii) Have others use, duplicate, and disclose the data for the Government for these purposes.

(2) To use, duplicate, and disclose data furnished under this clause, in accordance with subparagraph (h)(1) of this clause, in precedence over any other clause of this contract providing for rights in data.

(3) The Government is not precluded from using similar or identical data acquired from other sources. (End of clause)

54. *FAR 52.223-5 POLLUTION PREVENTION AND RIGHT-TO-KNOW INFORMATION (APR 1998) [For Work on Federal Facilities]

(a) Executive Order 12856 of August 3, 1993, requires Federal facilities to comply with the provisions of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11001-11050) and the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13101-13109).

(b) The Contractor shall provide all information needed by the Federal facility to comply with the emergency planning reporting requirements of Section 302 of EPCRA; the emergency notice requirements of Section 304 of EPCRA; the list of Material Safety Data Sheets required by Section 311 of EPCRA; the emergency and hazardous chemical inventory forms of Section 312 of EPCRA; the toxic chemical release inventory of Section 313 of EPCRA, which includes the reduction and recycling information required by Section 6607 of PPA; and the toxic chemical reduction goals requirements of Section 3-302 of Executive Order 12856.

55. *FAR 52.223-6 DRUG-FREE WORKPLACE (MAY 2001)

(a) Definitions. As used in this clause--

"Controlled substance" means a controlled substance in schedules I through V of section 202 of the Controlled Substances Act (21 U.S.C. 812) and as further defined in regulation at 21 CFR 1308.11 - 1308.15.

"Conviction" means a finding of guilt (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes.

"Criminal drug statute" means a Federal or non-Federal criminal statute involving the manufacture, distribution, dispensing, possession or use of any controlled substance.

"Drug-free workplace" means the site(s) for the performance of work done by the Contractor in connection with a specific contract where employees of the Contractor are prohibited from engaging in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance.

"Employee" means an employee of a Contractor directly engaged in the performance of work under a Government contract. "Directly engaged" is defined to include all direct cost employees and any other Contractor employee who has other than a minimal impact or involvement in contract performance.

"Individual" means an offeror/contractor that has no more than one employee including the offeror/contractor.

(b) The Contractor, if other than an individual, shall--within 30 days after award (unless a longer period is agreed to in writing for contracts of 30 days or more performance duration), or as soon as possible for contracts of less than 30 days performance duration--

(1) Publish a statement notifying its employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition;

(2) Establish an ongoing drug-free awareness program to inform such employees about--

(i) The dangers of drug abuse in the workplace;

(ii) The Contractor's policy of maintaining a drug-free workplace;

(iii) Any available drug counseling, rehabilitation, and employee assistance

programs; and

(iv) The penalties that may be imposed upon employees for drug abuse violations

occurring in the workplace.

(3) Provide all employees engaged in performance of the contract with a copy of the statement required by subparagraph (b)(1) of this clause;

(4) Notify such employees in writing in the statement required by subparagraph (b)(1) of this clause that, as a condition of continued employment on this contract, the employee will--

(i) Abide by the terms of the statement; and

(ii) Notify the employer in writing of the employee's conviction under a criminal drug statute for a violation occurring in the workplace no later than 5 days after such conviction.

(5) Notify the Contracting Officer in writing within 10 days after receiving notice under subdivision (b)(4)(ii) of this clause, from an employee or otherwise receiving actual notice of such conviction. The notice shall include the position title of the employee;

(6) Within 30 days after receiving notice under subdivision (b)(4)(ii) of this clause of a conviction, take one of the following actions with respect to any employee who is convicted of a drug abuse violation occurring in the workplace:

(i) Taking appropriate personnel action against such employee, up to and including termination; or

(ii) Require such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency; and

(7) Make a good faith effort to maintain a drug-free workplace through implementation of subparagraphs (b)(1) through (b)(6) of this clause.

(c) The Contractor, if an individual, agrees by award of the contract or acceptance of a purchase order, not to engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance while performing this contract.

(d) In addition to other remedies available to the Government, the Contractor's failure to comply with the requirements of paragraph (b) or (c) of this clause may, pursuant to FAR 23.560, render the Contractor subject to suspension of contract payments, termination of the contract for default, and suspension or debarment.

56. FAR 52.223-9 ESTIMATE OF PERCENTAGE OF RECOVERED MATERIAL CONTENT FOR EPA-DESIGNATED PRODUCTS (AUG 2000) [For Contracts exceeding \$100,000. EPA Designated product (available at <http://www.epa.gov/cpg/>)]

(a) Definitions. As used in this clause—

“Postconsumer material” means a material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item. Postconsumer material is a part of the broader category of “recovered material.”

“Recovered material” means waste materials and by-products recovered or diverted from solid waste, but the term does not include those materials and by-products generated from, and commonly reused within, an original manufacturing process.

(b) The Contractor, on completion of this contract, shall—

(1) Estimate the percentage of the total recovered material used in contract performance, including, if applicable, the percentage of postconsumer material content; and

(2) Submit this estimate to the Contracting Officer.

(End of clause)

**57. *FAR 52.223-14 TOXIC CHEMICAL RELEASE REPORTING (OCT 2000)
[For Contracts Over \$100,000]**

(a) Unless otherwise exempt, the Contractor, as owner or operator of a facility used in the performance of this contract, shall file by July 1 for the prior calendar year an annual Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023(a) and (g)), and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106). The Contractor shall file, for each facility subject to the Form R filing and reporting requirements, the annual Form R throughout the life of the contract.

(b) A Contractor owned or operated facility use in the performance of this contract is exempt from the requirement to file an annual Form R if--

(1) The facility does not manufacture, process or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);

(2) The facility does not have 10 or more full-time employees as specified in section 313(b)(1)(A) of EPCRA, 42 U.S.C. 11023(b)(1)(A);

(3) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

(4) The facility does not fall within Standard Industrial Classification Code (SIC) major groups 20 through 39 or their corresponding North American Industry Classification System (NAICS) sectors 31 through 33; or

(5) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

(c) If the Contractor has certified to an exemption in accordance with one or more of the criteria in paragraph (b) of this clause, and after award of the contract circumstances change so that any one of its owned or operated facilities used in the performance of this contract is no longer exempt-

(1) The Contractor shall notify the Contracting Officer;

and

(2) The Contractor, as owner or operator of a facility used in the performance of this contract is no longer exempt, shall (i) submit a Toxic Chemical Release Inventory Form (Form R) on or before July 1 for the prior calendar year during which the facility becomes eligible; and (ii) continue to file the annual Form R for the life of the contract for such facility.

(d) The Contracting Officer may terminate this contract or take other action as appropriate, if the Contractor fails to comply accurately and fully with the EPCRA and PPA toxic chemical release filing and reporting requirements.

(e) Except for acquisitions of commercial items, as defined in FAR Part 2, the Contractor shall-

(1) For competitive subcontracts expected to exceed \$100,000 (including all options), include a solicitation provision substantially the same as the provision at FAR 52.223-13, Certification of Toxic Chemical Release Reporting; and

(2) Include in any resultant subcontract exceeding \$100,000 (including all options), the substance of this clause, except this paragraph (e).

58. DFARS 252.223-7006 PROHIBITION ON STORAGE AND DISPOSAL OF TOXIC AND HAZARDOUS MATERIALS (APR 1993)

(a) Definitions. As used in this clause--

(1) "Storage" means a non-transitory, semi-permanent or permanent holding, placement, or leaving of material. It does not include a temporary accumulation of a limited quantity of a material used in or a waste generated or resulting from authorized activities, such as servicing, maintenance, or repair of Department of Defense (DoD) items, equipment, or facilities.

(2) "Toxic or hazardous materials" means:

(i) Materials referred to in section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (42 U.S.C. 9601(14)) and materials designated under section 102 of CERCLA (42 U.S.C. 9602) (40 CFR Part 302);

(ii) Materials that are of an explosive, flammable, or pyrotechnic nature; or

(iii) Materials otherwise identified by the Secretary of Defense as specified in DoD regulations.

(b) In accordance with 10 U.S.C. 2692, the Contractor is prohibited from storing or disposing of non-DoD-owned toxic or hazardous materials on a DoD installation, except to the extent authorized by a statutory exception to 10 U.S.C. 2692 or as authorized by the Secretary of Defense or his designee.

59. *FAR 52.225-9 BUY AMERICAN ACT—CONSTRUCTION MATERIALS (MAY 2002) (For Contracts less than \$6.806 million)

(a) *Definitions.* As used in this clause—

“Component” means an article, material, or supply incorporated directly into a construction material.

“Construction material” means an article, material, or supply brought to the construction site by the Contractor or a subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

“Cost of components” means—

(1) For components purchased by the Contractor, the acquisition cost, including transportation

costs to the place of incorporation into the construction material (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the end product.

“Domestic construction material” means—

(1) An unmanufactured construction material mined or produced in the United States; or

(2) A construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic.

“Foreign construction material” means a construction material other than a domestic construction material.

“United States” means the 50 States and the District of Columbia, U.S. territories and possessions, Puerto Rico, the Northern Mariana Islands, and any other place subject to U.S. jurisdiction, but does not include leased bases.

(b) *Domestic preference.* (1) This clause implements the Buy American Act (41 U.S.C. 10a - 10d) by providing a preference for domestic construction material. The Contractor shall use only domestic construction material in performing this contract, except as provided in paragraphs (b)(2) and (b)(3) of this clause.

(2) This requirement does not apply to the construction material or components listed by the Government as follows:

[Contracting Officer to list applicable excepted materials or indicate “none”]

(3) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(2) of this clause if the Government determines that—

(i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the requirements of the Buy American Act is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent;

(ii) The application of the restriction of the Buy American Act to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) *Request for determination of inapplicability of the Buy American Act.* (1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(3) of this clause shall include adequate information for Government evaluation of the request, including—

(A) A description of the foreign and domestic construction materials;

(B) Unit of measure;

(C) Quantity;

(D) Price;

(E) Time of delivery or availability;

(F) Location of the construction project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.

(2) If the Government determines after contract award that an exception to the Buy American Act applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(3)(i) of this clause.

(3) Unless the Government determines that an exception to the Buy American Act applies, use of foreign construction material is noncompliant with the Buy American Act.

(d) *Data*. To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers:

FOREIGN AND DOMESTIC CONSTRUCTION MATERIALS PRICE COMPARISON			
Construction Material Description	Unit of Measure	Quantity	Price (Dollars)*
Item 1:			
Foreign construction material			
Domestic construction material			
Item 2:			
Foreign construction material			
Domestic construction material			

[List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.]
[Include other applicable supporting information.]

[Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).]*

60. *FAR 52.225-10 NOTICE OF BUY AMERICAN ACT REQUIREMENT—CONSTRUCTION MATERIALS (MAY 2002) (Applicable with FAR 52.225-9)

(a) *Definitions*. “Construction material,” “domestic construction material,” and “foreign construction material,” as used in this provision, are defined in the clause of this solicitation entitled “Buy American Act—Construction Materials” (Federal Acquisition Regulation (FAR) clause 52.225-9).

(b) *Requests for determinations of inapplicability*. An offeror requesting a determination regarding the inapplicability of the Buy American Act should submit the request to the Contracting Officer in time to allow a determination before submission of offers. The offeror shall include the information and applicable supporting data required by paragraphs (c) and (d) of the clause at FAR 52.225-9 in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American Act before submitting its offer, or has not received a response to a previous request, the offeror shall include the information and supporting data in the offer.

(c) *Evaluation of offers*. (1) The Government will evaluate an offer requesting exception to the requirements of the Buy American Act, based on claimed unreasonable cost of domestic construction material, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(3)(i) of the clause at FAR 52.225-9.

(2) If evaluation results in a tie between an offeror that requested the substitution of foreign construction material based on unreasonable cost and an offeror that did not request an exception, the Contracting Officer will award to the offeror that did not request an exception based on unreasonable cost.

(d) *Alternate offers*. (1) When an offer includes foreign construction material not listed by the Government in this solicitation in paragraph (b)(2) of the clause at FAR 52.225-9, the offeror also may submit an alternate offer based on use of equivalent domestic construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of the clause at FAR 52.225-9 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of the clause at FAR 52.225-9 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic construction material, and the offeror shall be required to furnish such domestic construction material. An offer based on use of the foreign construction material for which an exception was requested—

- (i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or
- (ii) May be accepted if revised during negotiations.

(End of provision)

61. *FAR 52.225-11 BUY AMERICAN ACT—CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (JULY 2002) [For Contracts more than \$6,806,000] ALTERNATE I (MAY 2002) [For Contracts between \$6.806 and 7.068419 Million]

(a) *Definitions.* As used in this clause—

“Component” means an article, material, or supply incorporated directly into a construction material.

“Construction material” means an article, material, or supply brought to the construction site by the Contractor or subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

“Cost of components” means—

(1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the construction material (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the end product.

“Designated country” means any of the following countries:

Aruba	Kiribati
Austria	Korea, Republic of
Bangladesh	Lesotho
Belgium	Liechtenstein
Benin	Luxembourg
Bhutan	Malawi
Botswana	Maldives
Burkina Faso	Mali
Burundi	Mozambique
Canada	Nepal
Cape Verde	Netherlands
Central African Republic	Niger
Chad	Norway
Comoros	Portugal
Denmark	Rwanda
Djibouti	Sao Tome and Principe
Equatorial Guinea	Sierra Leone
Finland	Singapore
France	Somalia
Gambia	Spain
Germany	Sweden

Greece	Switzerland
Guinea	Tanzania U.R.
Guinea-Bissau	Togo
Haiti	Tuvalu
Hong Kong	Uganda
Iceland	United Kingdom
Ireland	Vanuatu
Israel	Western Samoa
Italy	Yemen
Japan	

“Designated country construction material” means a construction material that—

- (1) Is wholly the growth, product, or manufacture of a designated country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a designated country into a new and different construction material distinct from the materials from which it was transformed.

“Domestic construction material” means—

- (1) An unmanufactured construction material mined or produced in the United States; or
- (2) A construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic.

“Foreign construction material” means a construction material other than a domestic construction material.

“North American Free Trade Agreement country” means Canada or Mexico.

“North American Free Trade Agreement country construction material” means a construction material that—

- (1) Is wholly the growth, product, or manufacture of a North American Free Trade Agreement (NAFTA) country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a NAFTA country into a new and different construction material distinct from the materials from which it was transformed.

“United States” means the 50 States and the District of Columbia, U.S. territories and possessions, Puerto Rico, the Northern Mariana Islands, and any other place subject to U.S. jurisdiction, but does not include leased bases.

(b) *Construction materials.* (1) This clause implements the Buy American Act (41 U.S.C. 10a - 10d) by providing a preference for domestic construction material. In addition, the Contracting Officer has determined that the Trade Agreements Act and the North American Free Trade Agreement (NAFTA) apply to this acquisition. Therefore, the Buy American Act restrictions are waived for designated country and NAFTA country construction materials.

(2) The Contractor shall use only domestic, designated country, or NAFTA country construction material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.

(3) The requirement in paragraph (b)(2) of this clause does not apply to the construction materials or components listed by the Government as follows:

[Contracting Officer to list applicable excepted materials or indicate “none”]

(4) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(3) of this clause if the Government determines that—

- (i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the restrictions of the Buy American Act is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent;
- (ii) The application of the restriction of the Buy American Act to a particular construction material would be impracticable or inconsistent with the public interest; or
- (iii) The construction material is not mined, produced, or manufactured in the United

States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) *Request for determination of inapplicability of the Buy American Act.* (1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(4) of this clause shall include adequate information for Government evaluation of the request, including—

- (A) A description of the foreign and domestic construction materials;
- (B) Unit of measure;
- (C) Quantity;
- (D) Price;
- (E) Time of delivery or availability;
- (F) Location of the construction project;
- (G) Name and address of the proposed supplier; and
- (H) A detailed justification of the reason for use of foreign construction

materials cited in accordance with paragraph (b)(3) of this clause.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.

(2) If the Government determines after contract award that an exception to the Buy American Act applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(4)(i) of this clause.

(3) Unless the Government determines that an exception to the Buy American Act applies, use of foreign construction material is noncompliant with the Buy American Act.

(d) *Data.* To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers:

FOREIGN AND DOMESTIC CONSTRUCTION MATERIALS PRICE COMPARISON			
Construction Material Description	Unit of Measure	Quantity	Price (Dollars)*
Item 1:			
Foreign construction material			
Domestic construction material			
Item 2:			
Foreign construction material			
Domestic construction material			

[List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.]
[Include other applicable supporting information.]

[* Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).]

(End of clause)

Alternate I (May 2002). As prescribed in 25.1102(c)(3), delete the definitions of “North American Free Trade Agreement country” and “North American Free Trade Agreement country construction material” from the definitions in paragraph (a) of the basic clause and substitute the following paragraphs (b)(1) and (b)(2) for paragraphs (b)(1) and (b)(2) of the basic clause:

(b) *Construction materials.* (1) This clause implements the Buy American Act (41 U.S.C. 10a - 10d) by providing a preference for domestic construction material. In addition, the Contracting Officer has determined that the Trade Agreements Act applies to this acquisition. Therefore, the Buy American Act restrictions are waived for designated country construction materials.

(2) The Contractor shall use only domestic or designated country construction material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.

62. *FAR 52.225-12 NOTICE OF BUY AMERICAN ACT REQUIREMENT—CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (MAY 2002) [Applicable with FAR 52.225-11] ALTERNATE II (MAY 2002) [For Contracts Between 6.806 and 7.068419 Million]

(a) *Definitions.* “Construction material,” “designated country construction material,” “domestic construction material,” “foreign construction material,” and “NAFTA country construction material,” as used in this provision, are defined in the clause of this solicitation entitled “Buy American Act—Construction Materials under Trade Agreements” (Federal Acquisition Regulation (FAR) clause 52.225-11).

(b) *Requests for determination of inapplicability.* An offeror requesting a determination regarding the inapplicability of the Buy American Act should submit the request to the Contracting Officer in time to allow a determination before submission of offers. The offeror shall include the information and applicable supporting data required by paragraphs (c) and (d) of FAR clause 52.225-11 in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American Act before submitting its offer, or has not received a response to a previous request, the offeror shall include the information and supporting data in the offer.

(c) *Evaluation of offers.* (1) The Government will evaluate an offer requesting exception to the requirements of the Buy American Act, based on claimed unreasonable cost of domestic construction materials, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(4)(i) of FAR clause 52.225-11.

(2) If evaluation results in a tie between an offeror that requested the substitution of foreign construction material based on unreasonable cost and an offeror that did not request an exception, the Contracting Officer will award to the offeror that did not request an exception based on unreasonable cost.

(d) *Alternate offers.* (1) When an offer includes foreign construction material, other than designated country or NAFTA country construction material, that is not listed by the Government in this solicitation in paragraph (b)(3) of FAR clause 52.225-11, the offeror also may submit an alternate offer based on use of equivalent domestic, designated country, or NAFTA country construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-11 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of FAR clause 52.225-11 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic, designated country, or NAFTA country construction material, and the offeror shall be required to furnish such domestic, designated country, or NAFTA country construction material. An offer based on use of the foreign construction material for which an exception was requested—

- (i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or
- (ii) May be accepted if revised during negotiations.

(End of provision)

ALTERNATE II (MAY 2002) [For Contracts between 6.806 and 7.068419 Million]

As prescribed in 25.1102(d)(3), substitute the following paragraphs (a) and (d) for paragraphs (a) and (d) of the basic provision:

(a) *Definitions.* “Construction material,” “designated country construction material,” “domestic construction material,” and “foreign construction material,” as used in this provision, are defined in the clause of this solicitation entitled “Buy American Act—Construction Materials under Trade Agreements” (Federal Acquisition Regulation (FAR) clause 52.225-11).

(d) *Alternate offers.* (1) When an offer includes foreign construction material, other than designated country construction material, that is not listed by the Government in this solicitation in paragraph (b)(3) of FAR clause 52.225-11, the offeror also may submit an alternate offer based on use of equivalent domestic or designated country construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-11 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of FAR clause 52.225-11 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic or designated country construction material, and the offeror shall be required to furnish such domestic or designated country construction material. An offer based on use of the foreign construction material for which an exception was requested—

- (i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or
- (ii) May be accepted if revised during negotiations.

63. *FAR 52.225-13 RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (JULY 2000)

(a) The Contractor shall not acquire, for use in the performance of this contract, any supplies or services originating from sources within, or that were located in or transported from or through, countries whose products are banned from importation into the United States under regulations of the Office of Foreign Assets Control, Department of the Treasury. Those countries are Cuba, Iran, Iraq, Libya, North Korea, Sudan, the territory of Afghanistan controlled by the Taliban, and Serbia (excluding the territory of Kosovo).

(b) The Contractor shall not acquire for use in the performance of this contract any supplies or services from entities controlled by the government of Iraq.

(c) The Contractor shall insert this clause, including this paragraph (c), in all subcontracts.
(End of clause)

64. DFARS 252.226-7001 UTILIZATION OF INDIAN ORGANIZATIONS AND INDIAN-OWNED ECONOMIC ENTERPRISES--DOD CONTRACTS (SEP 2001)

(a) *Definitions.* As used in this clause--

"Indian" means any person who is a member of any Indian tribe, band, group, pueblo, or community that is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs (BIA) in accordance with 25 U.S.C. 1452(c) and any "Native" as defined in the Alaska Native Claims Settlement Act (43 U.S.C. 1601).

"Indian organization" means the governing body of any Indian tribe or entity established or recognized by the governing body of an Indian tribe for the purposes of 25 U.S.C. Chapter 17.

"Indian-owned economic enterprise" means any Indian-owned (as determined by the Secretary of the Interior) commercial, industrial, or business activity established or organized for the purpose of profit, provided that Indian ownership constitutes not less than 51 percent of the enterprise.

"Indian tribe" means any Indian tribe, band, group, pueblo, or community, including native villages and native groups (including corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, that is recognized by the Federal Government as eligible for services from BIA in accordance with 25 U.S.C. 1452(c).

"Interested party" means a contractor or an actual or prospective offeror whose direct economic interest would be affected by the award of a subcontract or by the failure to award a subcontract.

(b) The Contractor shall use its best efforts to give Indian organizations and Indian-owned economic enterprises the maximum practicable opportunity to participate in the subcontracts it awards, to the fullest extent consistent with efficient performance of the contract.

(c) The Contracting Officer and the Contractor, acting in good faith, may rely on the representation of an

Indian organization or Indian-owned economic enterprise as to its eligibility, unless an interested party challenges its status or the Contracting Officer has independent reason to question that status.

(d) In the event of a challenge to the representation of a subcontractor, the Contracting Officer will refer the matter to the--

U.S. Department of the Interior
Bureau of Indian Affairs
Attn: Chief, Division of Contracting and
Grants Administration
1849 C Street NW, MS-2626-MIB
Washington, DC 20240-4000.

The BIA will determine the eligibility and will notify the Contracting Officer. No incentive payment will be made--

- (1) Within 50 working days of subcontract award;
- (2) While a challenge is pending; or
- (3) If a subcontractor is determined to be an ineligible participant.

(e)(1) The Contractor, on its own behalf or on behalf of a subcontractor at any tier, may request an adjustment under the Indian Incentive Program to the following:

- (i) The estimated cost of a cost-type contract.
- (ii) The target cost of a cost-plus-incentive-fee contract.
- (iii) The target cost and ceiling price of a fixed-price incentive contract.
- (iv) The price of a firm-fixed-price contract.

(2) The amount of the adjustment that may be made to the contract is 5 percent of the estimated cost, target cost, or firm-fixed price included in the subcontract initially awarded to the Indian organization or Indian-owned economic enterprise.

(3) The Contractor has the burden of proving the amount claimed and must assert its request for an adjustment prior to completion of contract performance.

(4) The Contracting Officer, subject to the terms and conditions of the contract and the availability of funds, will authorize an incentive payment of 5 percent of the amount paid to the subcontractor.

(5) If the Contractor requests and receives an adjustment on behalf of a subcontractor, the Contractor is obligated to pay the subcontractor the adjustment.

(f) The Contractor shall insert the substance of this clause, including this paragraph (f), in all subcontracts that--

- (1) Are for other than commercial items; and
- (2) Are expected to exceed the simplified acquisition threshold in Part 2 of the Federal Acquisition

Regulation.

(End of clause)

65. *FAR 52.227-1

AUTHORIZATION AND CONSENT (JUL 1995)

(a) The Government authorizes and consents to all use and manufacture, in performing this contract or any subcontract at any tier, of any invention described in and covered by a United States patent

(1) embodied in the structure or composition of any article the delivery of which is accepted by the Government under this contract or

(2) used in machinery, tools, or methods whose use necessarily results from compliance by the Contractor or a subcontractor with

(i) specifications or written provisions forming a part of this contract or

(ii) specific written instructions given by the Contracting Officer directing the

manner of performance. The entire liability to the Government for infringement of a patent of the United States shall be determined solely by the provisions of the indemnity clause, if any, included in this contract or any subcontract hereunder (including any lower-tier subcontract), and the Government assumes liability for all other infringement to the extent of the authorization and consent hereinabove granted.

(b) The Contractor agrees to include, and require inclusion of, this clause, suitably modified to identify the parties, in all subcontracts at any tier for supplies or services (including construction, architect-engineer services, and materials, supplies, models, samples, and design or testing services expected to exceed the simplified acquisition threshold) however, omission of this clause from any subcontract, including those at or below the simplified acquisition threshold, does not affect this authorization and consent.

66. *FAR 52.227-2 NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT (AUG 1996)

(a) The Contractor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copy-right infringement based on the performance of this contract of which the Contractor has knowledge.

(b) In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed under this contract, the Contractor shall furnish to the Government, when requested by the Contracting Officer, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Contractor has agreed to indemnify the Government.

(c) The Contractor agrees to include, and require inclusion of, this clause in all subcontracts at any tier for supplies or services (including construction and architect-engineer subcontracts and those for material, supplies, models, samples, or design or testing services) expected to exceed the simplified acquisition threshold at FAR 2.101.

67. *FAR 52.227-4 PATENT INDEMNITY--CONSTRUCTION CONTRACTS (APR 1984)

Except as otherwise provided, the Contractor agrees to indemnify the Government and its officers, agents, and employees against liability, including costs and expenses, for infringement upon any United States patent (except a patent issued upon an application that is now or may hereafter be withheld from issue pursuant to a Secrecy Order under 35 U.S.C. 181) arising out of performing this contract or out of the use or disposal by or for the account of the Government of supplies furnished or work performed under this contract.

68. DFARS 252.227-7022 GOVERNMENT RIGHTS (UNLIMITED) (MAR 1979)

The Government shall have unlimited rights, in all drawings, designs, specifications, notes and other works developed in the performance of this contract, including the right to use same on any other Government design or construction without additional compensation to the Contractor. The Contractor hereby grants to the Government a paid-up license throughout the world to all such works to which he may assert or establish any claim under design patent or copyright laws. The Contractor for a period of three (3) years after completion of the project agrees to furnish the original or copies of all such works on the request of the Contracting Officer. (End of clause)

69. DFARS 252.227-7023 DRAWINGS AND OTHER DATA TO BECOME PROPERTY OF GOVERNMENT (MAR 1979)

All designs, drawings, specifications, notes and other works developed in the performance of this contract shall become the sole property of the Government and may be used on any other design or construction without additional compensation to the Contractor. The Government shall be considered the "person for whom the work was prepared" for the purpose of authorship in any copyrightable

70. DFARS 252.227-7033 RIGHTS IN SHOP DRAWINGS (APR 1966)

- (a) Shop drawings for construction means drawings, submitted to the Government by the Construction Contractor, subcontractor or any lower-tier subcontractor pursuant to a construction contract, showing in detail
- (i) the proposed fabrication and assembly of structural elements and (ii) the installation (i.e., form, fit, and attachment details) of materials or equipment. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.
- (b) This clause, including this paragraph (b), shall be included in all subcontracts hereunder at any tier.

71. *FAR 52.228-2 ADDITIONAL BOND SECURITY (OCT 1997)

The Contractor shall promptly furnish additional security required to protect the Government and persons supplying labor or materials under this contract if--

- (a) Any surety upon any bond, or issuing financial institution for other security, furnished with this contract becomes unacceptable to the Government;
- (b) Any surety fails to furnish reports on its financial condition as required by the Government;
- (c) The contract price is increased so that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer; or
- (d) An irrevocable letter of credit (ILC) used as security will expire before the end of the period of required security. If the Contractor does not furnish an acceptable extension or replacement ILC, or other acceptable substitute, at least 30 days before an ILC's scheduled expiration, the Contracting Officer has the right to immediately draw on the ILC.

72. *FAR 52.228-5 INSURANCE--WORK ON A GOVERNMENT INSTALLATION (JAN 1997) [For Contracts Exceeding \$100,000]

- (a) The Contractor shall, at its own expense, provide and maintain during the entire performance of this contract, at least the kinds and minimum amounts of insurance required in the Schedule or elsewhere in the contract.
- (b) Before commencing work under this contract, the Contractor shall notify the Contracting Officer in writing that the required insurance has been obtained. The policies evidencing required insurance shall contain an endorsement to the effect that any cancellation or any material change adversely affecting the Government's interest shall not be effective
- (1) for such period as the laws of the State in which this contract is to be performed prescribe, or
- (2) until 30 days after the insurer or the Contractor gives written notice to the Contracting Officer, whichever period is longer.
- (c) The Contractor shall insert the substance of this clause, including this paragraph (c), in subcontracts under this contract that require work on a Government installation and shall require subcontractors to provide and maintain the insurance required in the Schedule or elsewhere in the contract. The Contractor shall maintain a copy of all subcontractors' proofs of required insurance, and shall make copies available to the Contracting Officer upon request.

73. *FAR 52.228-11 PLEDGES OF ASSETS (FEB 1992)

- (a) Offerors shall obtain from each person acting as an individual surety on a bid guarantee, a performance bond, or a payment bond--
- (1) Pledge of assets; and
- (2) Standard Form 28, Affidavit of Individual Surety.
- (b) Pledges of assets from each person acting as an individual surety shall be in the form of--

- (1) Evidence of an escrow account containing cash, certificates of deposit, commercial or Government securities, or other assets described in FAR 28.203-2 (except see 28.203-2(b)(2) with respect to Government securities held in book entry form) and/or;
- (2) A recorded lien on real estate. The offeror will be required to provide--
 - (i) Evidence of title in the form of a certificate of title prepared by a title insurance company approved by the United States Department of Justice. This title evidence must show fee simple title vested in the surety along with any concurrent owners; whether any real estate taxes are due and payable; and any recorded encumbrances against the property, including the lien filed in favor of the Government as required by FAR 28.203-3(d);
 - (ii) Evidence of the amount due under any encumbrance shown in the evidence of title;
 - (iii) A copy of the current real estate tax assessment of the property or a current appraisal dated no earlier than 6 months prior to the date of the bond, prepared by a professional appraiser who certifies that the appraisal has been conducted in accordance with the generally accepted appraisal standards as reflected in the Uniform Standards of Professional Appraisal Practice, as promulgated by the Appraisal Foundation.

74. *FAR 52.228-12 PROSPECTIVE SUBCONTRACTOR REQUESTS FOR BONDS (OCT 1995)

In accordance with Section 806(a)(3) of Public Law 102-190, as amended by Sections 2091 and 8105 of Pub. L. 103-355, upon the request of a prospective subcontractor or supplier offering to furnish labor or material for the performance of this contract for which a payment bond has been furnished to the Government pursuant to the Miller Act, the Contractor shall promptly provide a copy of such payment bond to the requestor.

75. FAR 52.228-14 IRREVOCABLE LETTER OF CREDIT (DEC 1999)

(a) "Irrevocable letter of credit" (ILC), as used in this clause, means a written commitment by a federally insured financial institution to pay all or part of a stated amount of money, until the expiration date of the letter, upon presentation by the Government (the beneficiary) of a written demand therefor. Neither the financial institution nor the offeror/Contractor can revoke or condition the letter of credit.

(b) If the offeror intends to use an ILC in lieu of a bid bond, or to secure other types of bonds such as performance and payment bonds, the letter of credit and letter of confirmation formats in paragraphs (e) and (f) of this clause shall be used.

(c) The letter of credit shall be irrevocable, shall require presentation of no document other than a written demand and the ILC (including confirming letter, if any), shall be issued/confirmed by an acceptable federally insured financial institution as provided in paragraph (d) of this clause, and--

(1) If used as a bid guarantee, the ILC shall expire no earlier than 60 days after the close of the bid acceptance period;

(2) If used as an alternative to corporate or individual sureties as security for a performance or payment bond, the offeror/Contractor may submit an ILC to cover the entire period of performance or may submit an ILC with an initial expiration date estimated to cover the entire period for which financial security is required or may submit an ILC with an initial expiration that is a minimum period of one year from the date of issuance. The ILC shall provide that, unless the issuer provides the beneficiary written notice of non-renewal of least 60 days in advance of the current expiration date, the ILC is automatically extended without amendment for one year from the expiration date, or any future expiration date, until the period of required coverage is completed and the Contracting Officer provides the financial institution with a written statement waiving the right to payment. The period of required coverage shall be:

(i) For contracts subject to the Miller Act, the later of--

(A) One year following the expected date of final payment;

(B) For performance bonds only, until completion of any warranty period; or

(C) For payment bonds only, until resolution of all claims filed against the payment bond during the one-year period following final payment.

(ii) For contracts not subject to the Miller Act, the later of--

(A) 90 days following final payment; or

(B) For performance bonds only, until completion of any warranty period.

(d) Only federally insured financial institution rated investment grade or higher shall issue or confirm the ILC. The offeror/Contractor shall provide the Contracting Officer a credit rating that indicates the financial institution has the required rating(s) as of the date of issuance of the ILC. Unless the financial institution issuing the ILC had letter of credit business of at least \$25 million in the past year, ILCs over \$5 million must be confirmed by another acceptable financial institution that had letter of credit business of at least \$25 million in the past year.

(e) The following format shall be used by the issuing financial institution to create an ILC:

[Issuing Financial Institution's Letterhead or Name and Address]

Issue Date -----

Irrevocable Letter of Credit No.-----

Account party's name-----

Account party's address-----

For Solicitation No.-----

(For reference only)

TO: [U.S. Government agency]

[U.S. Government agency's address]

1. We hereby establish this irrevocable and transferable Letter of Credit in your favor for one or more drawings up to United States \$ _____. This Letter of Credit is payable at [issuing financial institution's and, if any, confirming financial institution's] office at [issuing financial institution's address and, if any, confirming financial institution's address] and expires with our close of business on _____, or any automatically extended expiration date.

2. We hereby undertake to honor your or transferee's sight draft(s) drawn on issuing or, if any, the confirming financial institution, for all or any part of this credit if presented with this Letter of Credit and confirmation, if any, at the office specified in paragraph 1 of this Letter of Credit on or before the expiration date or any automatically extended expiration date.

3. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this Letter of Credit that it is deemed to be automatically extended without amendment for one year from the expiration date hereof, or any future expiration date, unless at least 60 days prior to any expiration date, we notify you or the transferee by registered mail, or other receipted means of delivery, that we elect not to consider this Letter of Credit renewed for any such additional period. At the time we notify you, we also agree to notify the account party (and confirming financial institution, if any) by the same means of delivery.

4. This Letter of Credit is transferable. Transfers and assignments of proceeds are to be effected without charge to either the beneficiary or the transferee/assignee of proceeds. Such transfer or assignment shall be only at the written direction of the Government (the beneficiary) in a form satisfactory to the issuing financial institution and the confirming financial institution, if any.

5. This Letter of Credit is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ [state of confirming financial institution, if any, otherwise state of issuing financial institution].

6. If this credit expires during an interruption of business of this financial institution as described in Article 17 of the UCP, the financial institution specifically agrees to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

[Issuing financial institution]

(f) The following format shall be used by the financial institution to confirm an ILC:

[Confirming Financial Institution's Letterhead or Name and Address]---

(Date) _____

Our Letter of Credit

Advice Number-----

Beneficiary:-----

[U.S. Government agency]

Issuing Financial Institution:-----

Issuing Financial Institution's LC No.:-----

Gentlemen:

1. We hereby confirm the above indicated Letter of Credit, the original of which is attached, issued by _____ [name of issuing financial institution] for drawings of up to United States dollars _____/U.S. \$ _____ and expiring with our close of business on _____ [the expiration date], or any automatically extended expiration date.

2. Draft(s) drawn under the Letter of Credit and this Confirmation are payable at our office located at _____.

3. We hereby undertake to honor sight draft(s) drawn under and presented with the Letter of Credit and this Confirmation at our offices as specified herein.

4. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this confirmation that it be deemed automatically extended without amendment for one year from the expiration date hereof, or any automatically extended expiration date, unless:

(a) At least 60 days prior to any such expiration date, we shall notify the Contracting Officer, or the transferee and the issuing financial institution, by registered mail or other receipted means of delivery, that we elect not to consider this confirmation extended for any such additional period; or

(b) The issuing financial institution shall have exercised its right to notify you or the transferee, the account party, and ourselves, of its election not to extend the expiration date of the Letter of Credit.

5. This confirmation is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ [state of confirming financial institution].

6. If this confirmation expires during an interruption of business of this financial institution as described in Article 17 of the UCP, we specifically agree to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

[Confirming financial institution]

(g) The following format shall be used by the Contracting Officer for a sight draft to draw on the Letter of Credit:
SIGHT DRAFT

[City, State]

(Date) _____

[Name and address of financial institution]

Pay to the order of-----

[Beneficiary Agency] _____

the sum of United States \$ _____

This draft is drawn under-----
Irrevocable Letter of Credit No.-----

[Beneficiary Agency]
By: _____

76. *FAR 52.228-15 PERFORMANCE AND PAYMENT BONDS (JULY 2000)

(a) *Definitions.* As used in this clause—

“Original contract price” means the award price of the contract; or, for requirements contracts, the price payable for the estimated total quantity; or, for indefinite-quantity contracts, the price payable for the specified minimum quantity. Original contract price does not include the price of any options, except those options exercised at the time of contract award.

(b) *Amount of required bonds.* Unless the resulting contract price is \$100,000 or less, the successful offeror shall furnish performance and payment bonds to the Contracting Officer as follows:

(1) *Performance bonds (Standard Form 25).* The penal amount of performance bonds at the time of contract award shall be 100 percent of the original contract price.

(2) *Payment Bonds (Standard Form 25-A).* The penal amount of payment bonds at the time of contract award shall be 100 percent of the original contract price.

(3) *Additional bond protection.* (i) The Government may require additional performance and payment bond protection if the contract price is increased. The increase in protection generally will equal 100 percent of the increase in contract price.

(ii) The Government may secure the additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(c) *Furnishing executed bonds.* The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in the Bid Guarantee provision of the solicitation, or otherwise specified by the Contracting Officer, but in any event, before starting work.

(d) *Surety or other security for bonds.* The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register or may be obtained from the:

U.S. Department of Treasury
Financial Management Service
Surety Bond Branch
401 14th Street, NW, 2nd Floor, West Wing
Washington, DC 20227.

(e) *Notice of subcontractor waiver of protection (40 U.S.C. 270b(c)).* Any waiver of the right to sue on the payment bond is void unless it is in writing, signed by the person whose right is waived, and executed after such person has first furnished labor or material for use in the performance of the contract.
(End of clause)

77. FAR 52.229-3 FEDERAL, STATE, AND LOCAL TAXES (JAN 1991) [For Contracts Exceeding \$100,000]

(a) "Contract date," as used in this clause, means the date set for bid opening or, if this is a negotiated contract or a modification, the effective date of this contract or modification.

"All applicable Federal, State, and local taxes and duties," as used in this clause, means all taxes and duties, in effect on the contract date, that the taxing authority is imposing and collecting on the transactions or property covered by this contract.

"After-imposed Federal tax," as used in this clause, means any new or increased Federal excise tax or duty, or tax that was exempted or excluded on the contract date but whose exemption was later revoked or reduced during the contract period, on the transactions or property covered by this contract that the Contractor is required to pay or bear as the result of legislative, judicial, or administrative action taking effect after the contract date. It does not include social security tax or other employment taxes.

"After-relieved Federal tax," as used in this clause, means any amount of Federal excise tax or duty, except social security or other employment taxes, that would otherwise have been payable on the transactions or property covered by this contract, but which the Contractor is not required to pay or bear, or for which the Contractor obtains a refund or drawback, as the result of legislative, judicial, or administrative action taking effect after the contract date.

(b) The contract price includes all applicable Federal, State, and local taxes and duties.

(c) The contract price shall be increased by the amount of any after-imposed Federal tax, provided the Contractor warrants in writing that no amount for such newly imposed Federal excise tax or duty or rate increase was included in the contract price, as a contingency reserve or otherwise.

(d) The contract price shall be decreased by the amount of any after-relieved Federal tax.

(e) The contract price shall be decreased by the amount of any Federal excise tax or duty, except social security or other employment taxes, that the Contractor is required to pay or bear, or does not obtain a refund of, through the Contractor's fault, negligence, or failure to follow instructions of the Contracting Officer.

(f) No adjustment shall be made in the contract price under this clause unless the amount of the adjustment exceeds \$250.

(g) The Contractor shall promptly notify the Contracting Officer of all matters relating to any Federal excise tax or duty that reasonably may be expected to result in either an increase or decrease in the contract price and shall take appropriate action as the Contracting Officer directs.

(h) The Government shall, without liability, furnish evidence appropriate to establish exemption from any Federal, State, or local tax when the Contractor requests such evidence and a reasonable basis exists to sustain the exemption.

78. FAR 52.229-5 TAXES--CONTRACTS PERFORMED IN U.S. POSSESSIONS OR PUERTO RICO (APR 1984)

The term "local taxes," as used in the Federal, State, and local taxes clause of this contract, includes taxes imposed by a possession of the United States or by Puerto Rico.

79. FAR 52.230-1 COST ACCOUNTING STANDARDS NOTICES AND CERTIFICATION (JUNE 2000)

Note: This notice does not apply to small businesses or foreign governments. This notice is in three parts, identified by Roman numerals I through III.

Offerors shall examine each part and provide the requested information in order to determine Cost Accounting Standards (CAS) requirements applicable to any resultant contract.

If the offeror is an educational institution, Part II does not apply unless the contemplated contract will be subject to full or modified CAS coverage pursuant to 48 CFR 9903.201-2(c)(5) or 9903.201-2(c)(6), respectively.

I. DISCLOSURE STATEMENT--COST ACCOUNTING PRACTICES AND CERTIFICATION

(a) Any contract in excess of \$500,000 resulting from this solicitation will be subject to the requirements of the Cost Accounting Standards Board (48 CFR Chapter 99), except for those contracts which are exempt as specified in 48 CFR 9903.201-1.

(b) Any offeror submitting a proposal which, if accepted, will result in a contract subject to the requirements of 48 CFR Chapter 99 must, as a condition of contracting, submit a Disclosure Statement as required by 48 CFR 9903.202. When required, the Disclosure Statement must be submitted as a part of the offeror's proposal under this solicitation unless the offeror has already submitted a Disclosure Statement disclosing the practices used in connection with the pricing of this proposal. If an applicable Disclosure Statement has already been submitted, the offeror may satisfy the requirement for submission by providing the information requested in paragraph (c) of Part I of this provision.

CAUTION: In the absence of specific regulations or agreement, a practice disclosed in a Disclosure Statement shall not, by virtue of such disclosure, be deemed to be a proper, approved, or agreed-to practice for pricing proposals or accumulating and reporting contract performance cost data.

(c) Check the appropriate box below:

☐ (1) Certificate of Concurrent Submission of Disclosure Statement

The offeror hereby certifies that, as a part of the offer, copies of the Disclosure Statement have been submitted as follows: (i) original and one copy to the cognizant Administrative Contracting Officer (ACO) or cognizant Federal agency official authorized to act in that capacity (Federal official), as applicable, and (ii) one copy to the cognizant Federal auditor.

(Disclosure must be on Form No. CASB DS-1 or CASB DS-2, as applicable. Forms may be obtained from the cognizant ACO or Federal official and/or from the loose-leaf version of the Federal Acquisition Regulation.)

Date of Disclosure Statement: _____

Name and Address of Cognizant ACO or Federal Official Where Filed:

The offeror further certifies that the practices used in estimating costs in pricing this proposal are consistent with the cost accounting practices disclosed in the Disclosure Statement.

☐ (2) Certificate of Previously Submitted Disclosure Statement.

The offeror hereby certifies that the required Disclosure Statement was filed as follows:

Date of Disclosure Statement: _____

Name and Address of Cognizant ACO or Federal Official Where Filed:

The offeror further certifies that the practices used in estimating costs in pricing this proposal are consistent with the cost accounting practices disclosed in the applicable Disclosure Statement.

☐ (3) Certificate of Monetary Exemption.

The offeror hereby certifies that the offeror, together with all divisions, subsidiaries, and affiliates under common control, did not receive net awards of negotiated prime contracts and subcontracts subject to CAS totaling \$50 million or more in the cost accounting period immediately preceding the period in which this proposal was submitted. The offeror further certifies that if such status changes before an award resulting from this proposal, the offeror will advise the Contracting Officer immediately.

☐ (4) Certificate of Interim Exemption.

The offeror hereby certifies that (i) the offeror first exceeded the monetary exemption for disclosure, as defined in (3) of this subsection, in the cost accounting period immediately preceding the period in which this offer was submitted and (ii) in accordance with 48 CFR 9903.202-1, the offeror is not yet required to submit a Disclosure

Statement. The offeror further certifies that if an award resulting from this proposal has not been made within 90 days after the end of that period, the offeror will immediately submit a revised certificate to the Contracting Officer, in the form specified under subparagraph (c)(1) or (c)(2) of Part I of this provision, as appropriate, to verify submission of a completed Disclosure Statement.

CAUTION: Offerors currently required to disclose because they were awarded a CAS-covered prime contract or subcontract of \$50 million or more in the current cost accounting period may not claim this exemption (4). Further, the exemption applies only in connection with proposals submitted before expiration of the 90-day period following the cost accounting period in which the monetary exemption was exceeded.

II. COST ACCOUNTING STANDARDS--ELIGIBILITY FOR MODIFIED CONTRACT COVERAGE

If the offeror is eligible to use the modified provisions of 48 CFR 9903.201-2(b) and elects to do so, the offeror shall indicate by checking the box below. Checking the box below shall mean that the resultant contract is subject to the Disclosure and Consistency of Cost Accounting Practices clause in lieu of the Cost Accounting Standards clause.

☐ The offeror hereby claims an exemption from the Cost Accounting Standards clause under the provisions of 48 CFR 9903.201-2(b) and certifies that the offeror is eligible for use of the Disclosure and Consistency of Cost Accounting Practices clause because during the cost accounting period immediately preceding the period in which this proposal was submitted, the offeror received less than \$50 million in awards of CAS-covered prime contracts and subcontracts. The offeror further certifies that if such status changes before an award resulting from this proposal, the offeror will advise the Contracting Officer immediately.

CAUTION: An offeror may not claim the above eligibility for modified contract coverage if this proposal is expected to result in the award of a CAS-covered contract of \$50 million or more or if, during its current cost accounting period, the offeror has been awarded a single CAS-covered prime contract or subcontract of \$50 million or more.

III. ADDITIONAL COST ACCOUNTING STANDARDS APPLICABLE TO EXISTING CONTRACTS

The offeror shall indicate below whether award of the contemplated contract would, in accordance with subparagraph (a)(3) of the Cost Accounting Standards clause, require a change in established cost accounting practices affecting existing contracts and subcontracts.

☐ YES ☐ NO
(End of provision)

80. *FAR 52.230-2 COST ACCOUNTING STANDARDS (APR 1998)

(a) Unless the contract is exempt under 48 CFR 9903.201-1 and 9903.201-2, the provisions of 48 CFR Part 9903 are incorporated herein by reference and the Contractor, in connection with this contract, shall--

(1) (CAS-covered Contracts Only) By submission of a Disclosure Statement, disclose in writing the Contractor's cost accounting practices as required by 48 CFR 9903.202-1 through 9903.202-5, including methods of distinguishing direct costs from indirect costs and the basis used for allocating indirect costs. The practices disclosed for this contract shall be the same as the practices currently disclosed and applied on all other contracts and subcontracts being performed by the Contractor and which contain a Cost Accounting Standards (CAS) clause. If the Contractor has notified the Contracting Officer that the Disclosure Statement contains trade secrets and commercial or financial information which is privileged and confidential, the Disclosure Statement shall be protected and shall not be released outside of the Government.

(2) Follow consistently the Contractor's cost accounting practices in accumulating and reporting contract performance cost data concerning this contract. If any change in cost accounting practices is made for the purposes of any contract or subcontract subject to CAS requirements, the change must be applied prospectively to

this contract and the Disclosure Statement must be amended accordingly. If the contract price or cost allowance of this contract is affected by such changes, adjustment shall be made in accordance with subparagraph (a)(4) or (a)(5) of this clause, as appropriate.

(3) Comply with all CAS, including any modifications and interpretations indicated thereto contained in 48 CFR Part 9904, in effect on the date of award of this contract or, if the Contractor has submitted cost or pricing data, on the date of final agreement on price as shown on the Contractor's signed certificate of current cost or pricing data. The Contractor shall also comply with any CAS (or modifications to CAS) which hereafter become applicable to a contract or subcontract of the Contractor. Such compliance shall be required prospectively from the date of applicability to such contract or subcontract.

(4)(i) Agree to an equitable adjustment as provided in the Changes clause of this contract if the contract cost is affected by a change which, pursuant to subparagraph (a)(3) of this clause, the Contractor is required to make to the Contractor's established cost accounting practices.

(ii) Negotiate with the Contracting Officer to determine the terms and conditions under which a change may be made to a cost accounting practice, other than a change made under other provisions of subparagraph (a)(4) of this clause; provided that no agreement may be made under this provision that will increase costs paid by the United States.

(iii) When the parties agree to a change to a cost accounting practice, other than a change under subdivision (a)(4)(i) of this clause, negotiate an equitable adjustment as provided in the Changes clause of this contract.

(5) Agree to an adjustment of the contract price or cost allowance, as appropriate, if the Contractor or a subcontractor fails to comply with an applicable Cost Accounting Standard, or to follow any cost accounting practice consistently and such failure results in any increased costs paid by the United States. Such adjustment shall provide for recovery of the increased costs to the United States, together with interest thereon computed at the annual rate established under section 6621 of the Internal Revenue Code of 1986 (26 U.S.C. 6621) for such period, from the time the payment by the United States was made to the time the adjustment is effected. In no case shall the Government recover costs greater than the increased cost to the Government, in the aggregate, on the relevant contracts subject to the price adjustment, unless the Contractor made a change in its cost accounting practices of which it was aware or should have been aware at the time of price negotiations and which it failed to disclose to the Government.

(b) If the parties fail to agree whether the Contractor or a subcontractor has complied with an applicable CAS in 48 CFR 9904 or a CAS rule or regulation in 48 CFR 9903 and as to any cost adjustment demanded by the United States, such failure to agree will constitute a dispute under the Contract Disputes Act (41 U.S.C. 601).

(c) The Contractor shall permit any authorized representatives of the Government to examine and make copies of any documents, papers, or records relating to compliance with the requirements of this clause.

(d) The Contractor shall include in all negotiated subcontracts which the Contractor enters into, the substance of this clause, except paragraph (b), and shall require such inclusion in all other subcontracts, of any tier, including the obligation to comply with all CAS in effect on the subcontractor's award date or if the subcontractor has submitted cost or pricing data, on the date of final agreement on price as shown on the subcontractor's signed Certificate of Current Cost or Pricing Data. If the subcontract is awarded to a business unit which pursuant to 48 CFR 9903.201-2 is subject to other types of CAS coverage, the substance of the applicable clause set forth in subsection 30.201-4 of the Federal Acquisition Regulation shall be inserted. This requirement shall apply only to negotiated subcontracts in excess of \$500,000, except that the requirement shall not apply to negotiated subcontracts otherwise exempt from the requirement to include a CAS clause as specified in 48 CFR 9903.201-1.

(End of clause)

81. *FAR 52.230-3 DISCLOSURE AND CONSISTENCY OF COST ACCOUNTING PRACTICES (APR 1998)

(a) The Contractor, in connection with this contract, shall--

(1) Comply with the requirements of 48 CFR 9904.401, Consistency in Estimating, Accumulating, and Reporting Costs; 48 CFR 9904.402, Consistency in Allocating Costs Incurred for the Same Purpose; 48 CFR 9904.405, Accounting for Unallowable Costs; and 48 CFR 9904.406, Cost Accounting Standard--Cost Accounting Period, in effect on the date of award of this contract as indicated in 48 CFR Part 9904.

(2) (CAS-covered Contracts Only) If it is a business unit of a company required to submit a Disclosure Statement, disclose in writing its cost accounting practices as required by 48 CFR 9903.202-1 through 9903.202-5. If the Contractor has notified the Contracting Officer that the Disclosure Statement contains trade secrets and commercial or financial information which is privileged and confidential, the Disclosure Statement shall be protected and shall not be released outside of the Government.

(3)(i) Follow consistently the Contractor's cost accounting practices. A change to such practices may be proposed, however, by either the Government or the Contractor, and the Contractor agrees to negotiate with the Contracting Officer the terms and conditions under which a change may be made. After the terms and conditions under which the change is to be made have been agreed to, the change must be applied prospectively to this contract, and the Disclosure Statement, if affected, must be amended accordingly.

(ii) The Contractor shall, when the parties agree to a change to a cost accounting practice and the Contracting Officer has made the finding required in 48 CFR 9903.201-6(b), that the change is desirable and not detrimental to the interests of the Government, negotiate an equitable adjustment as provided in the Changes clause of this contract. In the absence of the required finding, no agreement may be made under this contract clause that will increase costs paid by the United States.

(4) Agree to an adjustment of the contract price or cost allowance, as appropriate, if the Contractor or a subcontractor fails to comply with the applicable CAS or to follow any cost accounting practice, and such failure results in any increased costs paid by the United States. Such adjustment shall provide for recovery of the increased costs to the United States together with interest thereon computed at the annual rate of interest established under the Internal Revenue Code of 1986 (26 U.S.C. 6621), from the time the payment by the United States was made to the time the adjustment is effected.

(b) If the parties fail to agree whether the Contractor has complied with an applicable CAS, rule, or regulation as specified in 48 CFR 9903 and 9904 and as to any cost adjustment demanded by the United States, such failure to agree will constitute a dispute under the Contract Disputes Act (41 U.S.C. 601).

(c) The Contractor shall permit any authorized representatives of the Government to examine and make copies of any documents, papers, and records relating to compliance with the requirements of this clause.

(d) The Contractor shall include in all negotiated subcontracts, which the Contractor enters into, the substance of this clause, except paragraph (b), and shall require such inclusion in all other subcontracts of any tier, except that--

(1) If the subcontract is awarded to a business unit which pursuant to 48 CFR 9903.201-2 is subject to other types of CAS coverage, the substance of the applicable clause set forth in subsection 30.201-4 of the Federal Acquisition Regulation shall be inserted.

(2) This requirement shall apply only to negotiated subcontracts in excess of \$500,000.

(3) The requirement shall not apply to negotiated subcontracts otherwise exempt from the requirement to include a CAS clause as specified in 48 CFR 9903.201-1.

(End of clause)

82. DFARS 252.231-7000 SUPPLEMENTAL COST PRINCIPLES (DEC 1991)

When the allowability of costs under this contract is determined in accordance with part 31 of the Federal Acquisition Regulation (FAR) allowability shall also be determined in accordance with part 231 of the DoD FAR Supplement, in effect on the date of this contract.

(a) Payment of Price. The Government shall pay the Contractor the contract price as provided in this contract.

(b) Progress Payments. The Government shall make progress payments monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer.

(1) The Contractor's request for progress payments shall include the following substantiation:

(i) An itemization of the amounts requested, related to the various elements of work required by the contract covered by the payment requested.

(ii) A listing of the amount included for work performed by each subcontractor under the contract.

(iii) A listing of the total amount of each subcontract under the contract.

(iv) A listing of the amounts previously paid to each such subcontractor under the contract.

(v) Additional supporting data in a form and detail required by the Contracting Officer.

(2) In the preparation of estimates, the Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the Contractor at locations other than the site also may be taken into consideration if--

(i) Consideration is specifically authorized by this contract; and

(ii) The Contractor furnishes satisfactory evidence that it has acquired title to such material and that the material will be used to perform this contract.

(c) Contractor Certification. Along with each request for progress payments, the Contractor shall furnish the following certification, or payment shall not be made: (However, if the Contractor elects to delete paragraph (c)(4) from the certification, the certification is still acceptable.) I hereby certify, to the best of my knowledge and belief, that--

(1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;

(2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements and the requirements of chapter 39 of Title 31, United States Code;

(3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract; and

(4) This certification is not to be construed as final acceptance of a subcontractor's performance.

(Name)

(Title)

(Date)

(d) Refund of Unearned Amounts. If the Contractor, after making a certified request for progress payments, discovers that a portion or all of such request constitutes a payment for performance by the Contractor that fails to conform to the specifications, terms, and conditions of this contract (hereinafter referred to as the "unearned amount"), the Contractor shall--

(1) Notify the Contracting Officer of such performance deficiency; and

(2) Be obligated to pay the Government an amount (computed by the Contracting Officer in the manner provided in paragraph (j) of this clause) equal to interest on the unearned amount from the 8th day after the date of receipt of the unearned amount until--

- (i) The date the Contractor notifies the Contracting Officer that the performance deficiency has been corrected; or
- (ii) The date the Contractor reduces the amount of any subsequent certified request for progress payments by an amount equal to the unearned amount.
- (e) Retainage. If the Contracting Officer finds that satisfactory progress was achieved during any period for which a progress payment is to be made, the Contracting Officer shall authorize payment to be made in full. However, if satisfactory progress has not been made, the Contracting Officer may retain a maximum of 10 percent of the amount of the payment until satisfactory progress is achieved. When the work is substantially complete, the Contracting Officer may retain from previously withheld funds and future progress payments that amount the Contracting Officer considers adequate for protection of the Government and shall release to the Contractor all the remaining withheld funds. Also, on completion and acceptance of each separate building, public work, or other division of the contract, for which the price is stated separately in the contract, payment shall be made for the completed work without retention of a percentage.
- (f) Title, Liability, and Reservation of Rights. All material and work covered by progress payments made shall, at the time of payment, become the sole property of the Government, but this shall not be construed as--
 - (1) Relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or
 - (2) Waiving the right of the Government to require the fulfillment of all of the terms of the contract.
- (g) Reimbursement for Bond Premiums. In making these progress payments, the Government shall, upon request, reimburse the Contractor for the amount of premiums paid for performance and payment bonds (including coinsurance and reinsurance agreements, when applicable) after the Contractor has furnished evidence of full payment to the surety. The retainage provisions in paragraph (e) of this clause shall not apply to that portion of progress payments attributable to bond premiums.
- (h) Final Payment. The Government shall pay the amount due the Contractor under this contract after--
 - (1) Completion and acceptance of all work;
 - (2) Presentation of a properly executed voucher; and
 - (3) Presentation of release of all claims against the Government arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned under the Assignment of Claims Act of 1940 (31 U.S.C. 3727 and 41 U.S.C. 15).
- (i) Limitation Because of Unfinalized Work. Notwithstanding any provision of this contract, progress payments shall not exceed 80 percent on work accomplished on unfinalized contract actions. A "contract action" is any action resulting in a contract, as defined in FAR Subpart 2.1, including contract modifications for additional supplies or services, but not including contract modifications that are within the scope and under the terms of the contract, such as contract modifications issued pursuant to the Changes clause, or funding and other administrative changes.
- (j) Interest Computation on Unearned Amounts. In accordance with 31 U.S.C. 3903(c)(1), the amount payable under subparagraph (d)(2) of this clause shall be--
 - (1) Computed at the rate of average bond equivalent rates of 91-day Treasury bills auctioned at the most recent auction of such bills prior to the date the Contractor receives the unearned amount; and
 - (2) Deducted from the next available payment to the Contractor.

84. RESERVED.

85. *FAR 52.232-10 PAYMENTS UNDER FIXED-PRICE ARCHITECT-ENGINEER CONTRACTS (AUG 1987)

(a) Estimates shall be made monthly of the amount and value of the work and services performed by the Contractor under this contract which meet the standards of quality established under this contract. The estimates shall be prepared by the Contractor and accompanied by any supporting data required by the Contracting Officer.

(b) Upon approval of the estimate by the Contracting Officer, payment upon properly executed vouchers shall be made to the Contractor, as soon as practicable, of 90 percent of the approved amount, less all previous payments; provided, that payment may be made in full during any months in which the Contracting Officer determines that performance has been satisfactory. Also, whenever the Contracting Officer determines that the work is substantially complete and that the amount retained is in excess of the amount adequate for the protection of the Government, the Contracting Officer may release the excess amount to the Contractor.

(c) Upon satisfactory completion by the Contractor and acceptance by the Contracting Officer of the work done by the Contractor under the "Statement of Architect-Engineer Services", the Contractor will be paid the unpaid balance of any money due for work under the statement, including retained percentages relating to this portion of the work. Upon satisfactory completion and final acceptance of the construction work, the Contractor shall be paid any unpaid balance of money due under this contract.

(d) Before final payment under the contract, or before settlement upon termination of the contract, and as a condition precedent thereto, the Contractor shall execute and deliver to the Contracting Officer a release of all claims against the Government arising under or by virtue of this contract, other than any claims that are specifically excepted by the Contractor from the operation of the release in amounts stated in the release.

(e) Notwithstanding any other provision in this contract, and specifically paragraph (b) of this clause, progress payments shall not exceed 80 percent on work accomplished on undefinitized contract actions. A "contract action" is any action resulting in a contract, as defined in FAR Subpart 2.1, including contract modifications for additional supplies or services, but not including contract modifications that are within the scope and under the terms of the contract, such as contract modifications issued pursuant to the Changes clause, or funding and other administrative changes. (End of clause)

86. *FAR 52.232-17 INTEREST (JUN 1996)

(a) Except as otherwise provided in this contract under a Price Reduction for Defective Cost or Pricing Data clause or a Cost Accounting Standards clause, all amounts that become payable by the Contractor to the Government under this contract (net of any applicable tax credit under the Internal Revenue Code (26 U.S.C. 1481)) shall bear simple interest from the date due until paid unless paid within 30 days of becoming due. The interest rate shall be the interest rate established by the Secretary of the Treasury as provided in Section 12 of the Contract Disputes Act of 1978 (Public Law 95-563), which is applicable to the period in which the amount becomes due, as provided in paragraph (b) of this clause, and then at the rate applicable for each six-month period as fixed by the Secretary until the amount is paid.

(b) Amounts shall be due at the earliest of the following dates:

- (1) The date fixed under this contract.
- (2) The date of the first written demand for payment consistent with this contract, including any demand resulting from a default termination.
- (3) The date the Government transmits to the Contractor a proposed supplemental agreement to confirm completed negotiations establishing the amount of debt.

(4) If this contract provides for revision of prices, the date of written notice to the Contractor stating the amount of refund payable in connection with a pricing proposal or a negotiated pricing agreement not confirmed by contract modification.

(c) The interest charge made under this clause may be reduced under the procedures prescribed in 32.614-2 of the Federal Acquisition Regulation in effect on the date of this contract.

87. *FAR 52.232-23 ASSIGNMENT OF CLAIMS (JAN 1986)

(a) The Contractor, under the Assignment of Claims Act, as amended, 31 U.S.C. 3727, 41 U.S.C. 15 (hereafter referred to as "the Act"), may assign its rights to be paid amounts due or to become due as a result of the performance of this contract to a bank, trust company, or other financing institution, including any Federal lending agency. The assignee under such an assignment may thereafter further assign or reassign its right under the original assignment to any type of financing institution described in the preceding sentence.

(b) Any assignment or reassignment authorized under the Act and this clause shall cover all unpaid amounts payable under this contract, and shall not be made to more than one party, except that an assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in the financing of this contract.

(c) The Contractor shall not furnish or disclose to any assignee under this contract any classified document (including this contract) or information related to work under this contract until the Contracting Officer authorizes such action in writing.

88. *FAR 52.232-26 PROMPT PAYMENT FOR FIXED-PRICE ARCHITECT-ENGINEER CONTRACTS (FEB 2002)

Notwithstanding any other payment terms in this contract, the Government will make invoice payments under the terms and conditions specified in this clause. The Government considers payment as being made on the day a check is dated or the date of an electronic funds transfer. Definitions of pertinent terms are set forth in sections 2.101, 32.001, and 32.902 of the Federal Acquisition Regulation. All days referred to in this clause are calendar days, unless otherwise specified. (However, see paragraph (a)(3) of this clause concerning payments due on Saturdays, Sundays, and legal holidays.)

(a) *Invoice payments*—(1) *Due date*. The due date for making invoice payments is—

(i) For work or services completed by the Contractor, the later of the following two events:

(A) The 30th day after the designated billing office receives a proper invoice from the Contractor (except as provided in paragraph (a)(1)(iii) of this clause).

(B) The 30th day after Government acceptance of the work or services completed by the Contractor. For a final invoice, when the payment amount is subject to contract settlement actions (e.g., release of claims), acceptance is deemed to occur on the effective date of the settlement.

(ii) The due date for progress payments is the 30th day after Government approval of Contractor estimates of work or services accomplished.

(iii) If the designated billing office fails to annotate the invoice or payment request with the actual date of receipt at the time of receipt, the payment due date is the 30th day after the date of the Contractor's invoice or payment request, provided the designated billing office receives a proper invoice or payment request and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(2) *Contractor's invoice*. The Contractor shall prepare and submit invoices to the designated billing office specified in the contract. A proper invoice must include the items listed in paragraphs (a)(2)(i) through (a)(2)(x) of this clause. If the invoice does not comply with these requirements, the designated billing office will return it within 7 days after receipt, with the reasons why it is not a proper invoice. When computing any interest penalty owed the Contractor, the Government will take into account if the Government notifies the Contractor of an improper invoice in an untimely manner.

(i) Name and address of the Contractor.

(ii) Invoice date and invoice number. (The Contractor should date invoices as close as possible to the date of mailing or transmission.)

(iii) Contract number or other authorization for work or services performed (including order number and contract line item number).

(iv) Description of work or services performed.

(v) Delivery and payment terms (e.g., discount for prompt payment terms).

(vi) Name and address of Contractor official to whom payment is to be sent (must be the same as that in the contract or in a proper notice of assignment).

(vii) Name (where practicable), title, phone number, and mailing address of person to notify in the event of a defective invoice.

(viii) Taxpayer Identification Number (TIN). The Contractor shall include its TIN on the invoice only if required elsewhere in this contract.

(ix) Electronic funds transfer (EFT) banking information.

(A) The Contractor shall include EFT banking information on the invoice only if

required elsewhere in this contract.

(B) If EFT banking information is not required to be on the invoice, in order for the invoice to be a proper invoice, the Contractor shall have submitted correct EFT banking information in accordance with the applicable solicitation provision (e.g., 52.232–38, Submission of Electronic Funds Transfer Information with Offer), contract clause (e.g., 52.232–33, Payment by Electronic Funds Transfer—Central Contractor Registration, or 52.232–34, Payment by Electronic Funds Transfer—Other Than Central Contractor Registration), or applicable agency procedures.

(C) EFT banking information is not required if the Government waived the requirement to pay by EFT.

(x) Any other information or documentation required by the contract.

(3) *Interest penalty.* The designated payment office will pay an interest penalty automatically, without request from the Contractor, if payment is not made by the due date and the conditions listed in paragraphs (a)(3)(i) through (a)(3)(iii) of this clause are met, if applicable. However, when the due date falls on a Saturday, Sunday, or legal holiday, the designated payment office may make payment on the following working day without incurring a late payment interest penalty.

(i) The designated billing office received a proper invoice.

(ii) The Government processed a receiving report or other Government documentation authorizing payment and there was no disagreement over quantity, quality, Contractor compliance with any contract term or condition, or requested progress payment amount.

(iii) In the case of a final invoice for any balance of funds due the Contractor for work or services performed, the amount was not subject to further contract settlement actions between the Government and the Contractor.

(4) *Computing penalty amount.* The Government will compute the interest penalty in accordance with the Office of Management and Budget prompt payment regulations at 5 CFR part 1315.

(i) For the sole purpose of computing an interest penalty that might be due the Contractor, Government acceptance or approval is deemed to occur constructively as shown in paragraphs (a)(4)(i)(A) and (B) of this clause. If actual acceptance or approval occurs within the constructive acceptance or approval period, the Government will base the determination of an interest penalty on the actual date of acceptance or approval. Constructive acceptance or constructive approval requirements do not apply if there is a disagreement over quantity, quality, Contractor compliance with a contract provision, or requested progress payment amounts. These requirements also do not compel Government officials to accept work or services, approve Contractor estimates, perform contract administration functions, or make payment prior to fulfilling their responsibilities.

(A) For work or services completed by the Contractor, Government acceptance is deemed to occur constructively on the 7th day after the Contractor completes the work or services in accordance with the terms and conditions of the contract.

(B) For progress payments, Government approval is deemed to occur on the 7th day after the designated billing office receives the Contractor estimates.

(ii) The prompt payment regulations at 5 CFR 1315.10(c) do not require the Government to pay interest penalties if payment delays are due to disagreement between the Government and the Contractor over the payment amount or other issues involving contract compliance, or on amounts temporarily withheld or retained in accordance with the terms of the contract. The Government and the Contractor shall resolve claims involving disputes, and any interest that may be payable in accordance with the clause at FAR 52.233–1, Disputes.

(5) *Discounts for prompt payment.* The designated payment office will pay an interest penalty automatically, without request from the Contractor, if the Government takes a discount for prompt payment improperly. The Government will calculate the interest penalty in accordance with 5 CFR part 1315.

(6) *Additional interest penalty*

(i) The designated payment office will pay a penalty amount, calculated in accordance with the prompt payment regulations at 5 CFR part 1315, in addition to the interest penalty amount only if—

(A) The Government owes an interest penalty of \$1 or more;

(B) The designated payment office does not pay the interest penalty within 10 days after the date the invoice amount is paid; and

(C) The contractor makes a written demand to the designated payment office for

additional penalty payment, in accordance with paragraph (a)(6)(ii) of this clause, postmarked not later than 40 days after the date the invoice amount is paid.

(ii)(A) The Contractor shall support written demands for additional penalty payments with the following data. The Government will not request any additional data. The Contractor shall—

(1) Specifically assert that late payment interest is due under a specific invoice, and request payment of all overdue late payment interest penalty and such additional penalty as may be required;

(2) Attach a copy of the invoice on which the unpaid late payment interest is due; and

(3) State that payment of the principal has been received, including the date of receipt.

(B) If there is no postmark or the postmark is illegible—

(1) The designated payment office that receives the demand will annotate it with the date of receipt, provided the demand is received on or before the 40th day after payment was made; or

(2) If the designated payment office fails to make the required annotation, the Government will determine the demand's validity based on the date the Contractor has placed on the demand, provided such date is no later than the 40th day after payment was made.

(iii) The additional penalty does not apply to payments regulated by other Government regulations (*e.g.*, payments under utility contracts subject to tariffs and regulation).

(b) *Contract financing payments.* If this contract provides for contract financing, the Government will make contract financing payments in accordance with the applicable contract financing clause.

(c) *Overpayments.* If the Contractor becomes aware of a duplicate payment or that the Government has otherwise overpaid on an invoice payment, the Contractor shall immediately notify the Contracting Officer and request instructions for disposition of the overpayment. (End of clause)

89. *FAR 52.232-27 PROMPT PAY FOR CONSTRUCTION CONTRACTS (FEB 2002)

Notwithstanding any other payment terms in this contract, the Government will make invoice payments under the terms and conditions specified in this clause. The Government considers payment as being made on the day a check is dated or the date of an electronic funds transfer. Definitions of pertinent terms are set forth in sections 2.101, 32.001, and 32.902 of the Federal Acquisition Regulation. All days referred to in this clause are calendar days, unless otherwise specified. (However, see paragraph (a)(3) concerning payments due on Saturdays, Sundays, and legal holidays.)

(a) *Invoice payments*—(1) *Types of invoice payments.* For purposes of this clause, there are several types of invoice payments that may occur under this contract, as follows:

(i) Progress payments, if provided for elsewhere in this contract, based on Contracting Officer approval of the estimated amount and value of work or services performed, including payments for reaching milestones in any project.

(A) The due date for making such payments is 14 days after the designated billing office receives a proper payment request. If the designated billing office fails to annotate the payment request with the actual date of receipt at the time of receipt, the payment due date is the 14th day after the date of the Contractor's payment request, provided the designated billing office receives a proper payment request and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(B) The due date for payment of any amounts retained by the Contracting Officer in accordance with the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts, is as specified in the contract or, if not specified, 30 days after approval by the Contracting Officer for release to the Contractor.

(ii) Final payments based on completion and acceptance of all work and presentation of release of all claims against the Government arising by virtue of the contract, and payments for partial deliveries that have been accepted by the Government (*e.g.*, each separate building, public work, or other division of the contract for which the price is stated separately in the contract).

(A) The due date for making such payments is the later of the following two events:

(1) The 30th day after the designated billing office receives a proper invoice from the Contractor.

(2) The 30th day after Government acceptance of the work or services completed by the Contractor. For a final invoice when the payment amount is subject to contract settlement actions (e.g., release of claims), acceptance is deemed to occur on the effective date of the contract settlement.

(B) If the designated billing office fails to annotate the invoice with the date of actual receipt at the time of receipt, the invoice payment due date is the 30th day after the date of the Contractor's invoice, provided the designated billing office receives a proper invoice and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(2) *Contractor's invoice.* The Contractor shall prepare and submit invoices to the designated billing office specified in the contract. A proper invoice must include the items listed in paragraphs (a)(2)(i) through (a)(2)(xi) of this clause. If the invoice does not comply with these requirements, the designated billing office must return it within 7 days after receipt, with the reasons why it is not a proper invoice. When computing any interest penalty owed the Contractor, the Government will take into account if the Government notifies the Contractor of an improper invoice in an untimely manner.

(i) Name and address of the Contractor.

(ii) Invoice date and invoice number. (The Contractor should date invoices as close as possible to the date of mailing or transmission.)

(iii) Contract number or other authorization for work or services performed (including order number and contract line item number).

(iv) Description of work or services performed.

(v) Delivery and payment terms (e.g., discount for prompt payment terms).

(vi) Name and address of Contractor official to whom payment is to be sent (must be the same as that in the contract or in a proper notice of assignment).

(vii) Name (where practicable), title, phone number, and mailing address of person to notify in the event of a defective invoice.

(viii) For payments described in paragraph (a)(1)(i) of this clause, substantiation of the amounts requested and certification in accordance with the requirements of the clause at 52.232–5, Payments Under Fixed-Price Construction Contracts.

(ix) Taxpayer Identification Number (TIN). The Contractor shall include its TIN on the invoice only if required elsewhere in this contract.

(x) Electronic funds transfer (EFT) banking information.

(A) The Contractor shall include EFT banking information on the invoice only if required elsewhere in this contract.

(B) If EFT banking information is not required to be on the invoice, in order for the invoice to be a proper invoice, the Contractor shall have submitted correct EFT banking information in accordance with the applicable solicitation provision (e.g., 52.232–38, Submission of Electronic Funds Transfer Information with Offer), contract clause (e.g., 52.232–33, Payment by Electronic Funds Transfer—Central Contractor Registration, or 52.232–34, Payment by Electronic Funds Transfer—Other Than Central Contractor Registration), or applicable agency procedures.

(C) EFT banking information is not required if the Government waived the requirement to pay by EFT.

(xi) Any other information or documentation required by the contract.

(3) *Interest penalty.* The designated payment office will pay an interest penalty automatically, without request from the Contractor, if payment is not made by the due date and the conditions listed in paragraphs (a)(3)(i) through (a)(3)(iii) of this clause are met, if applicable. However, when the due date falls on a Saturday, Sunday, or legal holiday, the designated payment office may make payment on the following working day without incurring a late payment interest penalty.

(i) The designated billing office received a proper invoice.

(ii) The Government processed a receiving report or other Government documentation authorizing payment and there was no disagreement over quantity, quality, Contractor compliance with any contract term or condition, or requested progress payment amount.

(iii) In the case of a final invoice for any balance of funds due the Contractor for work or services performed, the amount was not subject to further contract settlement actions between the Government and the Contractor.

(4) *Computing penalty amount.* The Government will compute the interest penalty in accordance with the Office of Management and Budget prompt payment regulations at 5 CFR part 1315.

(i) For the sole purpose of computing an interest penalty that might be due the Contractor for payments described in paragraph (a)(1)(ii) of this clause, Government acceptance or approval is deemed to occur constructively on the 7th day after the Contractor has completed the work or services in accordance with the terms and conditions of the contract. If actual acceptance or approval occurs within the constructive acceptance or approval period, the Government will base the determination of an interest penalty on the actual date of acceptance or approval. Constructive acceptance or constructive approval requirements do not apply if there is a disagreement over quantity, quality, or Contractor compliance with a contract provision. These requirements also do not compel Government officials to accept work or services, approve Contractor estimates, perform contract administration functions, or make payment prior to fulfilling their responsibilities.

(ii) The prompt payment regulations at 5 CFR 1315.10(c) do not require the Government to pay interest penalties if payment delays are due to disagreement between the Government and the Contractor over the payment amount or other issues involving contract compliance, or on amounts temporarily withheld or retained in accordance with the terms of the contract. The Government and the Contractor shall resolve claims involving disputes, and any interest that may be payable in accordance with the clause at FAR 52.233-1, Disputes.

(5) *Discounts for prompt payment.* The designated payment office will pay an interest penalty automatically, without request from the Contractor, if the Government takes a discount for prompt payment improperly. The Government will calculate the interest penalty in accordance with the prompt payment regulations at 5 CFR part 1315.

(6) *Additional interest penalty.* (i) The designated payment office will pay a penalty amount, calculated in accordance with the prompt payment regulations at 5 CFR part 1315 in addition to the interest penalty amount only if—

(A) The Government owes an interest penalty of \$1 or more;

(B) The designated payment office does not pay the interest penalty within 10 days after the date the invoice amount is paid; and

(C) The Contractor makes a written demand to the designated payment office for additional penalty payment, in accordance with paragraph (a)(6)(ii) of this clause, postmarked not later than 40 days after the date the invoice amount is paid.

(ii)(A) The Contractor shall support written demands for additional penalty payments with the following data. The Government will not request any additional data. The Contractor shall—

(1) Specifically assert that late payment interest is due under a specific invoice, and request payment of all overdue late payment interest penalty and such additional penalty as may be required;

(2) Attach a copy of the invoice on which the unpaid late payment interest was due; and

(3) State that payment of the principal has been received, including the date of receipt.

(B) If there is no postmark or the postmark is illegible—

(1) The designated payment office that receives the demand will annotate it with the date of receipt provided the demand is received on or before the 40th day after payment was made; or

(2) If the designated payment office fails to make the required annotation, the Government will determine the demand's validity based on the date the Contractor has placed on the demand, provided such date is no later than the 40th day after payment was made.

(b) *Contract financing payments.* If this contract provides for contract financing, the Government will make contract financing payments in accordance with the applicable contract financing clause.

(c) *Subcontract clause requirements.* The Contractor shall include in each subcontract for property or services (including a material supplier) for the purpose of performing this contract the following:

(1) *Prompt payment for subcontractors.* A payment clause that obligates the Contractor to pay the

subcontractor for satisfactory performance under its subcontract not later than 7 days from receipt of payment out of such amounts as are paid to the Contractor under this contract.

(2) *Interest for subcontractors.* An interest penalty clause that obligates the Contractor to pay to the subcontractor an interest penalty for each payment not made in accordance with the payment clause—

(i) For the period beginning on the day after the required payment date and ending on the date on which payment of the amount due is made; and

(ii) Computed at the rate of interest established by the Secretary of the Treasury, and published in the **Federal Register**, for interest payments under section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(3) *Subcontractor clause flowdown.* A clause requiring each subcontractor to

(i) Include a payment clause and an interest penalty clause conforming to the standards set forth in paragraphs (c)(1) and (c)(2) of this clause in each of its subcontracts; and

(ii) Require each of its subcontractors to include such clauses in their subcontracts with each lower-tier subcontractor or supplier.

(d) *Subcontract clause interpretation.* The clauses required by paragraph (c) of this clause shall not be construed to impair the right of the Contractor or a subcontractor at any tier to negotiate, and to include in their subcontract, provisions that—

(1) *Retention permitted.* Permit the Contractor or a subcontractor to retain (without cause) a specified percentage of each progress payment otherwise due to a subcontractor for satisfactory performance under the subcontract without incurring any obligation to pay a late payment interest penalty, in accordance with terms and conditions agreed to by the parties to the subcontract, giving such recognition as the parties deem appropriate to the ability of a subcontractor to furnish a performance bond and a payment bond;

(2) *Withholding permitted.* Permit the Contractor or subcontractor to make a determination that part or all of the subcontractor's request for payment may be withheld in accordance with the subcontract agreement; and

(3) *Withholding requirements.* Permit such withholding without incurring any obligation to pay a late payment penalty if—

(i) A notice conforming to the standards of paragraph (g) of this clause previously has been furnished to the subcontractor; and

(ii) The Contractor furnishes to the Contracting Officer a copy of any notice issued by a Contractor pursuant to paragraph (d)(3)(i) of this clause.

(e) *Subcontractor withholding procedures.* If a Contractor, after making a request for payment to the Government but before making a payment to a subcontractor for the subcontractor's performance covered by the payment request, discovers that all or a portion of the payment otherwise due such subcontractor is subject to withholding from the subcontractor in accordance with the subcontract agreement, then the Contractor shall—

(1) *Subcontractor notice.* Furnish to the subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon ascertaining the cause giving rise to a withholding, but prior to the due date for subcontractor payment;

(2) *Contracting Officer notice.* Furnish to the Contracting Officer, as soon as practicable, a copy of the notice furnished to the subcontractor pursuant to paragraph (e)(1) of this clause;

(3) *Subcontractor progress payment reduction.* Reduce the subcontractor's progress payment by an amount not to exceed the amount specified in the notice of withholding furnished under paragraph (e)(1) of this clause;

(4) *Subsequent subcontractor payment.* Pay the subcontractor as soon as practicable after the correction of the identified subcontract performance deficiency, and—

(i) Make such payment within—

(A) Seven days after correction of the identified subcontract performance deficiency (unless the funds therefor must be recovered from the Government because of a reduction under paragraph (e)(5)(i) of this clause; or

(B) Seven days after the Contractor recovers such funds from the Government;

or

(ii) Incur an obligation to pay a late payment interest penalty computed at the rate of interest established by the Secretary of the Treasury, and published in the **Federal Register**, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues

the obligation to pay an interest penalty;

(5) *Notice to Contracting Officer.* Notify the Contracting Officer upon—

- (i) Reduction of the amount of any subsequent certified application for payment; or
- (ii) Payment to the subcontractor of any withheld amounts of a progress payment,

specifying—

- (A) The amounts withheld under paragraph (e)(1) of this clause; and
- (B) The dates that such withholding began and ended; and

(6) *Interest to Government.* Be obligated to pay to the Government an amount equal to interest on the withheld payments (computed in the manner provided in 31 U.S.C. 3903(c)(1)), from the 8th day after receipt of the withheld amounts from the Government until—

- (i) The day the identified subcontractor performance deficiency is corrected; or
- (ii) The date that any subsequent payment is reduced under paragraph (e)(5)(i) of this

clause.

(f) *Third-party deficiency reports—*(1) *Withholding from subcontractor.* If a Contractor, after making payment to a first-tier subcontractor, receives from a supplier or subcontractor of the first-tier subcontractor (hereafter referred to as a “second-tier subcontractor”) a written notice in accordance with section 2 of the Act of August 24, 1935 (40 U.S.C. 270b, Miller Act), asserting a deficiency in such first-tier subcontractor’s performance under the contract for which the Contractor may be ultimately liable, and the Contractor determines that all or a portion of future payments otherwise due such first-tier subcontractor is subject to withholding in accordance with the subcontract agreement, the Contractor may, without incurring an obligation to pay an interest penalty under paragraph (e)(6) of this clause—

- (i) Furnish to the first-tier subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon making such determination; and
- (ii) Withhold from the first-tier subcontractor’s next available progress payment or payments an amount not to exceed the amount specified in the notice of withholding furnished under paragraph (f)(1)(i) of this clause.

(2) *Subsequent payment or interest charge.* As soon as practicable, but not later than 7 days after receipt of satisfactory written notification that the identified subcontract performance deficiency has been corrected, the Contractor shall—

- (i) Pay the amount withheld under paragraph (f)(1)(ii) of this clause to such first-tier subcontractor; or
- (ii) Incur an obligation to pay a late payment interest penalty to such first-tier subcontractor computed at the rate of interest established by the Secretary of the Treasury, and published in the **Federal Register**, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(g) *Written notice of subcontractor withholding.* The Contractor shall issue a written notice of any withholding to a subcontractor (with a copy furnished to the Contracting Officer), specifying—

- (1) The amount to be withheld;
- (2) The specific causes for the withholding under the terms of the subcontract; and
- (3) The remedial actions to be taken by the subcontractor in order to receive payment of the amounts withheld.

(h) *Subcontractor payment entitlement.* The Contractor may not request payment from the Government of any amount withheld or retained in accordance with paragraph (d) of this clause until such time as the Contractor has determined and certified to the Contracting Officer that the subcontractor is entitled to the payment of such amount.

(i) *Prime-subcontractor disputes.* A dispute between the Contractor and subcontractor relating to the amount or entitlement of a subcontractor to a payment or a late payment interest penalty under a clause included in the subcontract pursuant to paragraph (c) of this clause does not constitute a dispute to which the Government is a party. The Government may not be interpleaded in any judicial or administrative proceeding involving such a dispute.

(j) *Preservation of prime-subcontractor rights.* Except as provided in paragraph (i) of this clause, this clause shall not limit or impair any contractual, administrative, or judicial remedies otherwise available to the Contractor or a subcontractor in the event of a dispute involving late payment or nonpayment by the Contractor or deficient subcontract performance or nonperformance by a subcontractor.

(k) *Non-recourse for prime contractor interest penalty.* The Contractor's obligation to pay an interest penalty to a subcontractor pursuant to the clauses included in a subcontract under paragraph (c) of this clause shall not be construed to be an obligation of the Government for such interest penalty. A cost-reimbursement claim may not include any amount for reimbursement of such interest penalty.

(l) *Overpayments.* If the Contractor becomes aware of a duplicate payment or that the Government has otherwise overpaid on an invoice payment, the Contractor shall immediately notify the Contracting Officer and request instructions for disposition of the overpayment.

(End of clause)

90. *FAR 52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER –CENTRAL CONTRACTOR REGISTRATION (MAY 1999)

(a) *Method of payment.* (1) All payments by the Government under this contract shall be made by electronic funds transfer (EFT), except as provided in paragraph (a)(2) of this clause. As used in this clause, the term "EFT" refers to the funds transfer and may also include the payment information transfer.

(2) In the event the Government is unable to release one or more payments by EFT, the Contractor agrees to either—

(i) Accept payment by check or some other mutually agreeable method of payment; or

(ii) Request the Government to extend the payment due date until such time as the Government can make payment by EFT (but see paragraph (d) of this clause).

(b) *Contractor's EFT information.* The Government shall make payment to the Contractor using the EFT information contained in the Central Contractor Registration (CCR) database. In the event that the EFT information changes, the Contractor shall be responsible for providing the updated information to the CCR database.

(c) *Mechanisms for EFT payment.* The Government may make payment by EFT through either the Automated Clearing House (ACH) network, subject to the rules of the National Automated Clearing House Association, or the Fedwire Transfer System. The rules governing Federal payments through the ACH are contained in 31 CFR part 210.

(d) *Suspension of payment.* If the Contractor's EFT information in the CCR database is incorrect, then the Government need not make payment to the Contractor under this contract until correct EFT information is entered into the CCR database; and any invoice or contract financing request shall be deemed not to be a proper invoice for the purpose of prompt payment under this contract. The prompt payment terms of the contract regarding notice of an improper invoice and delays in accrual of interest penalties apply.

(e) *Contractor EFT arrangements.* If the Contractor has identified multiple payment receiving points (i.e., more than one remittance address and/or EFT information set) in the CCR database, and the Contractor has not notified the Government of the payment receiving point applicable to this contract, the Government shall make payment to the first payment receiving point (EFT information set or remittance address as applicable) listed in the CCR database.

(f) *Liability for uncompleted or erroneous transfers.* (1) If an uncompleted or erroneous transfer occurs because the Government used the Contractor's EFT information incorrectly, the Government remains responsible for—

(i) Making a correct payment;

(ii) Paying any prompt payment penalty due; and

(iii) Recovering any erroneously directed funds.

(2) If an uncompleted or erroneous transfer occurs because the Contractor's EFT information was incorrect, or was revised within 30 days of Government release of the EFT payment transaction instruction to the Federal Reserve System, and—

(i) If the funds are no longer under the control of the payment office, the Government is deemed to have made payment and the Contractor is responsible for recovery of any erroneously directed funds; or

(ii) If the funds remain under the control of the payment office, the Government shall not make payment, and the provisions of paragraph (d) of this clause shall apply.

(g) *EFT and prompt payment.* A payment shall be deemed to have been made in a timely manner in accordance with the prompt payment terms of this contract if, in the EFT payment transaction instruction released to

the Federal Reserve System, the date specified for settlement of the payment is on or before the prompt payment due date, provided the specified payment date is a valid date under the rules of the Federal Reserve System.

(h) *EFT and assignment of claims.* If the Contractor assigns the proceeds of this contract as provided for in the assignment of claims terms of this contract, the Contractor shall require as a condition of any such assignment, that the assignee shall register in the CCR database and shall be paid by EFT in accordance with the terms of this clause. In all respects, the requirements of this clause shall apply to the assignee as if it were the Contractor. EFT information that shows the ultimate recipient of the transfer to be other than the Contractor, in the absence of a proper assignment of claims acceptable to the Government, is incorrect EFT information within the meaning of paragraph (d) of this clause.

(i) *Liability for change of EFT information by financial agent.* The Government is not liable for errors resulting from changes to EFT information made by the Contractor's financial agent.

(j) *Payment information.* The payment or disbursing office shall forward to the Contractor available payment information that is suitable for transmission as of the date of release of the EFT instruction to the Federal Reserve System. The Government may request the Contractor to designate a desired format and method(s) for delivery of payment information from a list of formats and methods the payment office is capable of executing. However, the Government does not guarantee that any particular format or method of delivery is available at any particular payment office and retains the latitude to use the format and delivery method most convenient to the Government. If the Government makes payment by check in accordance with paragraph (a) of this clause, the Government shall mail the payment information to the remittance address contained in the CCR database.
(End of Clause)

91. DFARS 252.232-7004 DOD PROGRESS PAYMENT RATES (OCT 2001)

(a) If the contractor is a small business concern, the Progress Payments clause of this contract is modified to change each mention of the progress payment rate and liquidation rate (excepting paragraph (k), *Limitations on Undefinitized Contract Actions*) to 90 percent.

(b) If the contractor is a small disadvantaged business concern, the Progress Payments clause of this contract is modified to change each mention of the progress payment rate and liquidation rate (excepting paragraph (k), *Limitations on Undefinitized Contract Actions*) to 95 percent.
(End of clause)

92. DFARS 252.232-7005 REIMBURSEMENT OF SUBCONTRACTOR ADVANCE PAYMENTS--DOD PILOT MENTOR-PROTEGE PROGRAM (SEP 2001)

(a) The Government will reimburse the Contractor for any advance payments made by the Contractor, as a mentor firm, to a protege firm, pursuant to an approved mentor-protege agreement, provided--

(1) The Contractor's subcontract with the protege firm includes a provision substantially the same as FAR 52.232-12, Advance Payments;

(2) The Contractor has administered the advance payments in accordance with the policies of FAR Subpart 32.4; and

(3) The Contractor agrees that any financial loss resulting from the failure or inability of the protege firm to repay any unliquidated advance payments is the sole financial responsibility of the Contractor.

(b) For a fixed price type contract, advance payments made to a protege firm shall be paid and administered as if they were 100 percent progress payments. The Contractor shall include as a separate attachment with each Standard Form (SF) 1443, Contractor's Request for Progress Payment, a request for reimbursement of advance payments made to a protege firm. The attachment shall provide a separate calculation of lines 14a through 14e of SF 1443 for each protege, reflecting the status of advance payments made to that protege.

(c) For cost reimbursable contracts, reimbursement of advance payments shall be made via public voucher. The Contractor shall show the amounts of advance payments made to each protege on the public voucher, in the form and detail directed by the cognizant contracting officer or contract auditor.
(End of clause)

93. *FAR 52.233-1 DISPUTES (JULY 2002)

(a) This contract is subject to the Contract Disputes Act of 1978, as amended (41 U.S.C. 601-613).

(b) Except as provided in the Act, all disputes arising under or relating to this contract shall be resolved under this clause.

(c) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to this contract. However, a written demand or written assertion by the Contractor seeking the payment of money exceeding \$100,000 is not a claim under the Act until certified. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim under the Act. The submission may be converted to a claim under the Act, by complying with the submission and certification requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

(d)(1) A claim by the Contractor shall be made in writing and, unless otherwise stated in this contract, submitted within 6 years after accrual of the claim to the Contracting Officer for a written decision. A claim by the Government against the Contractor shall be subject to a written decision by the Contracting Officer.

(2) (i) Contractors shall provide the certification specified in paragraph (d)(2)(iii) of this clause when submitting any claim exceeding \$100,000.

(ii) The certification requirement does not apply to issues in controversy that have not been submitted as all or part of a claim.

(iii) The certification shall state as follows:

'I certify that the claim is made in good faith; that the supporting data are accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the contract adjustment for which the Contractor believes the Government is liable; and that I am duly authorized to certify the claim on behalf of the Contractor.'

(3) The certification may be executed by any person duly authorized to bind the Contractor with respect to the claim.

(e) For Contractor claims of \$100,000 or less, the Contracting Officer must, if requested in writing by the Contractor, render a decision within 60 days of the request. For Contractor-certified claims over \$100,000, the Contracting Officer must, within 60 days, decide the claim or notify the Contractor of the date by which the decision will be made.

(f) The Contracting Officer's decision shall be final unless the Contractor appeals or files a suit as provided in the Act.

(g) If the claim by the Contractor is submitted to the Contracting Officer or a claim by the Government is presented to the Contractor, the parties, by mutual consent, may agree to use alternative dispute resolution (ADR). If the Contractor refuses an offer for ADR, the Contractor shall inform the Contracting Officer, in writing, of the Contractor's specific reasons for rejecting the offer.

(h) The Government shall pay interest on the amount found due and unpaid from (1) the date the Contracting Officer receives the claim (certified if required), or (2) the date that payment otherwise would be due, if that date is later, until the date of payment. With regard to claims having defective certifications, as defined in (FAR) 48 CFR 33.201, interest shall be paid from the date that the Contracting Officer initially receives the claim. Simple interest on claims shall be paid at the rate, fixed by the Secretary of the Treasury as provided in the Act, which is applicable to the period during which the Contracting Officer receives the claim and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary during the pendency of the claim.

(i) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under the contract, and comply with any decision of the Contracting Officer.

94. *FAR 52.233-11 DISPUTES (JULY 2002) ALTERNATE I (DEC 1991)

(a) This contract is subject to the Contract Disputes Act of 1978, as amended (41 U.S.C. 601-613).

(b) Except as provided in the Act, all disputes arising under or relating to this contract shall be resolved under this clause.

(c) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to this contract. However, a written demand or written assertion by the Contractor seeking the payment of money exceeding \$100,000 is not a claim under the Act until certified. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim under the Act. The submission may be converted to a claim under the Act, by complying with the submission and certification requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

(d)(1) A claim by the Contractor shall be made in writing and, unless otherwise stated in this contract, submitted within 6 years after accrual of the claim to the Contracting Officer for a written decision. A claim by the Government against the Contractor shall be subject to a written decision by the Contracting Officer.

(2) (i) Contractors shall provide the certification specified in paragraph (d)(2)(iii) of this clause when submitting any claim exceeding \$100,000.

(ii) The certification requirement does not apply to issues in controversy that have not been submitted as all or part of a claim.

(iii) The certification shall state as follows: "I certify that the claim is made in good faith; that the supporting data are accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the contract adjustment for which the Contractor believes the Government is liable; and that I am duly authorized to certify the claim on behalf of the Contractor."

(3) The certification may be executed by any person duly authorized to bind the Contractor with respect to the claim.

(e) For Contractor claims of \$100,000 or less, the Contracting Officer must, if requested in writing by the Contractor, render a decision within 60 days of the request. For Contractor-certified claims over \$100,000, the Contracting Officer must, within 60 days, decide the claim or notify the Contractor of the date by which the decision will be made.

(f) The Contracting Officer's decision shall be final unless the Contractor appeals or files a suit as provided in the Act.

(g) If the claim by the Contractor is submitted to the Contracting Officer or a claim by the Government is presented to the Contractor, the parties, by mutual consent, may agree to use alternative dispute resolution (ADR). If the Contractor refuses an offer for ADR, the Contractor shall inform the Contracting Officer, in writing, of the Contractor's specific reasons for rejecting the offer.

(h) The Government shall pay interest on the amount found due and unpaid from (1) the date that the Contracting Officer receives the claim (certified, if required); or (2) the date that payment otherwise would be due, if that date is later, until the date of payment. With regard to claims having defective certifications, as defined in FAR 33.201, interest shall be paid from the date that the Contracting Officer initially receives the claim. Simple interest on claims shall be paid at the rate, fixed by the Secretary of the Treasury as provided in the Act, which is applicable to the period during which the Contracting Officer receives the claim and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary during the pendency of the claim.

(i) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under or relating to the contract, and comply with any decision of the Contracting Officer. (End of clause)

95. *FAR 52.233-3 PROTEST AFTER AWARD (AUG 1996)

(a) Upon receipt of a notice of protest (as defined in FAR 33.101) or a determination that a protest is likely (see FAR 33.102(d)), the Contracting Officer may, by written order to the Contractor, direct the Contractor to stop performance of the work called for by this contract. The order shall be specifically identified as a stop-work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Upon receipt of the final decision in the protest, the Contracting Officer shall either--

(1) Cancel the stop-work order; or

(2) Terminate the work covered by the order as provided in the Default, or the Termination for Convenience of the Government, clause of this contract.

(b) If a stop-work order issued under this clause is canceled either before or after a final decision in the protest, the Contractor shall resume work. The Contracting Officer shall make an equitable adjustment in the delivery schedule or contract price, or both, and the contract shall be modified, in writing, accordingly, if--

(1) The stop-work order results in an increase in the time required for, or in the Contractor's cost properly allocable to, the performance of any part of this contract; and

(2) The Contractor asserts its right to an adjustment within 30 days after the end of the period of work stoppage; provided, that if the Contracting Officer decides the facts justify the action, the Contracting Officer may receive and act upon a proposal at any time before final payment under this contract.

(c) If a stop-work order is not canceled and the work covered by the order is terminated for the convenience of the Government, the Contracting Officer shall allow reasonable costs resulting from the stop-work order in arriving at the termination settlement.

(d) If a stop-work order is not canceled and the work covered by the order is terminated for default, the Contracting Officer shall allow, by equitable adjustment or otherwise, reasonable costs resulting from the stop-work order.

(e) The Government's rights to terminate this contract at any time are not affected by action taken under this clause.

(f) If, as the result of the Contractor's intentional or negligent misstatement, misrepresentation, or miscertification, a protest related to this contract is sustained, and the Government pays costs, as provided in FAR 33.102(b)(2) or 33.104(h)(1), the Government may require the Contractor to reimburse the Government the amount of such costs. In addition to any other remedy available, and pursuant to the requirements of Subpart 32.6, the Government may collect this debt by offsetting the amount against any payment due the Contractor under any contract between the Contractor and the Government.

96. RESERVED.

97. FAR 52.236-2 DIFFERING SITE CONDITIONS (APR 1984)

(a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of

(1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or

(2) unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.

(b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, an equitable adjustment shall be made under this clause and the contract modified in writing accordingly.

(c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required, provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.

(d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

98. *FAR 52.236-3 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (APR 1984)

(a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to

- (1) conditions bearing upon transportation, disposal, handling, and storage of materials;
- (2) the availability of labor, water, electric power, and roads;
- (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site;
- (4) the conformation and conditions of the ground; and
- (5) the character of equipment and facilities needed preliminary to and during work

performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Government, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Government.

(b) The Government assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the Government. Nor does the Government assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

99. *FAR 52.236-5 MATERIAL AND WORKMANSHIP (APR 1984)

(a) All equipment, material, and articles incorporated into the work covered by this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.

(b) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. When directed to do so, the Contractor shall submit samples for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

(c) All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may require, in writing, that the Contractor remove from the work any employee the Contracting Officer deems incompetent, careless, or otherwise objectionable.

100. *FAR 52.236-6 SUPERINTENDENCE BY THE CONTRACTOR (APR 1984)

At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the work site a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.

101. FAR 52.236-7 PERMITS AND RESPONSIBILITIES (NOV 1991)

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any Federal, State, and municipal laws, codes, and regulations applicable to the performance of the work. The Contractor shall also be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.

102. *FAR 52.236-8 OTHER CONTRACTS (APR 1984)

The Government may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with Government employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by Government employees.

103. *FAR 52.236-9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984)

(a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.

(b) The Contractor shall protect from damage all existing improvements and utilities

- (1) at or near the work site, and
- (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refused to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

104. FAR 52.236-10 OPERATIONS AND STORAGE AREAS (APR 1984)

(a) The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.

(b) Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.

(c) The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or

regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

105. *FAR 52.236-11 USE AND POSSESSION PRIOR TO COMPLETION (APR 1984)

(a) The Government shall have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the Government intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The Government's possession or use shall not be deemed an acceptance of any work under the contract.

(b) While the Government has such possession or use, the Contractor shall be relieved of the responsibility for the loss of or damage to the work resulting from the Government's possession or use, notwithstanding the terms of the clause in this contract entitled "Permits and Responsibilities." If prior possession or use by the Government delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.

106. *FAR 52.236-12 CLEANING UP (APR 1984)

The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Contractor shall remove from the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not the property of the Government. Upon completing the work, the Contractor shall leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer.

107. *FAR 52.236-13 ACCIDENT PREVENTION-ALTERNATE I (NOV 1991)

(a) The Contractor shall provide and maintain work environments and procedures which will (1) safeguard the public and Government personnel, property, materials, supplies, and equipment exposed to Contractor operations and activities; (2) avoid interruptions of Government operations and delays in project completion dates; and (3) control costs in the performance of this contract.

(b) For these purposes on contracts for construction or dismantling, demolition, or removal of improvements, the Contractor shall--

(1) Provide appropriate safety barricades, signs, and signal lights;
(2) Comply with the standards issued by the Secretary of Labor at 29 CFR Part 1926 and 29 CFR Part 1910; and

(3) Ensure that any additional measures the Contracting Officer determines to be reasonably necessary for the purposes are taken.

(c) If this contract is for construction or dismantling, demolition or removal of improvements with any Department of Defense agency or component, the Contractor shall comply with all pertinent provisions of the latest version of U.S. Army Corps of engineers Safety and Health Requirements Manual, EM 385-1-1, in effect on the date of the solicitation.

(d) Whenever the Contracting Officer becomes aware of any noncompliance with these requirements or any condition which poses a serious or imminent danger to the health or safety of the public or Government personnel, the Contracting Officer shall notify the Contractor orally, with written confirmation, and request immediate initiation of corrective action. This notice, when delivered to the Contractor or the Contractor's representative at the work site, shall be deemed sufficient notice of the noncompliance and that corrective action is required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the

work until satisfactory corrective action has been taken. The Contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any stop work order issued under this clause.

(e) The Contractor shall insert this clause, including this paragraph (e), with appropriate changes in the designation of the parties, in subcontractors.

(f) Before commencing the work, the Contractor shall--

(1) Submit a written proposed plan for implementing this clause. The plan shall include an analysis of the significant hazards to life, limb, and property inherent in contract work performance and a plan for controlling these hazards; and

(2) Meet with representatives of the Contracting Officer to discuss and develop a mutual understanding relative to administration of the overall safety program.

108. *FAR 52.236-14 AVAILABILITY AND USE OF UTILITY SERVICES (APR 1984)

(a) The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

(b) The Contractor, at its expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

109. FAR 52.236-15 SCHEDULES FOR CONSTRUCTION CONTRACTS (APR 1984)

(a) The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring materials, plant, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits the required schedule.

(b) The Contractor shall enter the actual progress on the chart as directed by the Contracting Officer, and upon doing so shall immediately deliver three copies of the annotated schedule to the Contracting Officer. If, in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the Government. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.

(c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of this contract.

110. *FAR 52.236-17 LAYOUT OF WORK (APR 1984)

The Contractor shall lay out its work from Government-established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

111. FAR 52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)

(a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

(b) Wherever in the specifications or upon the drawings the words "directed," "required," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the "direction," "requirement," "order," "designation," or "prescription," of the Contracting Officer is intended and similarly the words "approved," "acceptable," "satisfactory," or words of like import shall mean "approved by," or "acceptable to," or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.

(c) Where "as shown," "as indicated," "as detailed," or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place," that is "furnished and installed."

(d) Shop drawings means drawings, submitted to the Government by the Contractor, subcontractor, or any lower tier subcontractor pursuant to a construction contract, showing in detail

(1) the proposed fabrication and assembly of structural elements, and

(2) the installation (i.e., fit, and attachment details) of materials or equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the Government's reasons therefor. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.

(f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Contracting Officer approves any such variation, the Contracting Officer shall issue an appropriate contract modification, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.

(g) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the Contracting Officer and one set will be returned to the Contractor.

112. *FAR 52.236-23 RESPONSIBILITY OF THE ARCHITECT-ENGINEER CONTRACTOR (APR 1984)

(a) The Contractor shall be responsible for the professional quality, technical accuracy, and the coordination of all designs, drawings, specifications, and other services furnished by the Contractor under this contract. The Contractor shall, without additional compensation, correct or revise any errors or deficiencies in its designs, drawings, specifications, and other services.

(b) Neither the Government's review, approval or acceptance of, nor payment for, the services required under this contract shall be construed to operate as a waiver of any rights under this contract or of any cause of action arising out of the performance of this contract, and the Contractor shall be and remain liable to the Government in accordance with applicable law for all damages to the Government caused by the Contractor's negligent performance of any of the services furnished under this contract.

(c) The rights and remedies of the Government provided for under this contract are in addition to any other rights and remedies provided by law.

(d) If the Contractor is comprised of more than one legal entity, each such entity shall be jointly and severally liable hereunder. (End of clause)

113. *FAR 52.236-24 WORK OVERSIGHT IN ARCHITECT-ENGINEER CONTRACTS (APR 1984)

The extent and character of the work to be done by the Contractor shall be subject to the general oversight, supervision, direction, control, and approval of the Contracting Officer. (End of clause)

114. *FAR 52.236-25 REQUIREMENTS FOR REGISTRATION OF DESIGNERS (APR 1984)

The design of architectural, structural, mechanical, electrical, civil, or other engineering features of the work shall be accomplished or reviewed and approved by architects or engineers registered to practice in the particular professional field involved in a State or possession of the United States, in Puerto Rico, or in the District of Columbia. (End of clause)

115. *FAR 52.236-26 PRECONSTRUCTION CONFERENCE (FEB 1995)

If the Contracting Officer decides to conduct a preconstruction conference, the successful offeror will be notified and will be required to attend. The Contracting Officer's notification will include specific details regarding the date, time, and location of the conference, any need for attendance by subcontractors, and information regarding the items to be discussed.

116. DFARS 252.236-7000 MODIFICATION OF PROPOSALS - PRICE BREAKDOWN (DEC 1991)

(a) The Contractor shall furnish a price breakdown, itemized as required and within the time specified by the Contracting Officer, with any proposal for a contract modification.

(b) The price breakdown--

(1) Must include sufficient detail to permit an analysis of profit, and of all costs for--

- (i) Material;
 - (ii) Labor,
 - (iii) Equipment;
 - (iv) Subcontracts; and
- (2) Most cover all work involved in the modification, whether the work was deleted, added, or changed.
- (c) The Contractor shall provide similar price breakdowns to support any amounts claimed for subcontracts.
- (d) The Contractor's proposal shall include a justification for any time extension proposed.

117. *FAR 52.242-13 BANKRUPTCY (JUL 1995)

In the event the Contractor enters into proceedings relating to bankruptcy, whether voluntary or involuntary, the Contractor agrees to furnish, by certified mail or electronic commerce method authorized by the contract, written notification of the bankruptcy to the Contracting Officer responsible for administering the contract. This notification shall be furnished within five days of the initiation of the proceedings relating to bankruptcy filing. This notification shall include the date on which the bankruptcy petition was filed, the identity of the court in which the bankruptcy petition was filed, and a listing of Government contract numbers and contracting offices for all Government contracts against which final payment has not been made. This obligation remains in effect until final payment under this contract.

118. *FAR 52.242-14 SUSPENSION OF WORK (APR 1984)

- (a) The Contracting Officer may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the Government.
- (b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified in this contract (or within a reasonable time if not specified), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by the unreasonable suspension, delay, or interruption, and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor, or for which an equitable adjustment is provided for or excluded under any other term or condition of this contract.
- (c) A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

119. DFARS 252.242-7005 COST/SCHEDULE STATUS REPORT (MAR 1998)

- (a) The Contractor shall use management procedures in the performance of this contract that provide for--
 - (1) Planning and control of costs;
 - (2) Measurement of performance (value for completed tasks); and
 - (3) Generation of timely and reliable information for the cost/schedule status report (C/SSR).
- (b) As a minimum, these procedures must provide for--

- (1) Establishing the time-phased budgeted cost of work scheduled (including work authorization, budgeting, and scheduling), the budgeted cost for work performed, the actual cost of work performed, the budget at completion, the estimate at completion, and provisions for subcontractor performance measurement and reporting;
 - (2) Applying all direct and indirect costs and provisions for use and control of management reserve and undistributed budget;
 - (3) Incorporating changes to the contract budget base for both Government directed changes and internal replanning;
 - (4) Establishing constraints to preclude subjective adjustment of data to ensure performance measurement remains realistic. The total allocated budget may exceed the contract budget base only after consultation with the Contracting Officer. For cost-reimbursement contracts, the contract budget base shall exclude changes for cost growth increases, other than for authorized changes to the contract scope; and
 - (5) Establishing the capability to accurately identify and explain significant cost and schedule variances, both on a cumulative basis and projected at completion basis.
- (c) The Offeror/Contractor may use a cost/schedule control system that has been recognized by the cognizant Administrative Contracting Officer (ACO) as complying with the earned value management system criteria provided in DoD 5000.2-R, Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs.
- (d) The Government may require integrated baseline reviews. Such reviews shall be scheduled as early as practicable and should be conducted within 180 calendar days after (1) contract award, (2) the exercise of significant contract options, or (3) the incorporation of major modifications. The objective of the integrated baseline review is for the Government and the Contractor to jointly assess areas, such as the Contractor's planning, to ensure complete coverage of the statement of work, logical scheduling of the work activities, adequate resourcing, and identification of inherent risks.
- (e) The Contractor shall provide access to all pertinent records, company procedures, and data requested by the Contracting Officer, or authorized representative, to--
- (1) Show proper implementation of the procedures generating the cost schedule information being used to satisfy the C/SSR contractual data requirements to the Government; and
 - (2) Ensure continuing application of the accepted company procedures in satisfying the C/SSR data item.
- (f) The Contractor shall submit any substantive changes to the procedures and their impact to the ACO for review.
- (g) The Contractor shall require a subcontractor to furnish C/SSR in each case where the subcontract is other than firm fixed-price, is 12 months or more in duration, and has critical or significant tasks related to the prime contract. Critical or significant tasks shall be defined by mutual agreement between the Government and Contractor. Each subcontractor's reported cost and schedule information shall be incorporated into the Contractor's C/SSR.
- (End of clause)

120. *FAR 52.243-1 CHANGES--FIXED-PRICE (AUG 1987) ALTERNATE III (AUG 1984)

- (a) The Contracting Officer may at any time, by written order, and without notice to the sureties, if any, make changes within the general scope of this contract in the services to be performed.
- (b) If any such change causes an increase or decrease in the cost of, or the time required for, performance of any part of the work under this contract, whether or not changed by the order, the Contracting Officer shall make an equitable adjustment in the contract price, the delivery schedule, or both, and shall modify the contract.
- (c) The Contractor must assert its right to an adjustment under this clause within 30 days from the date of receipt of the written order. However, if the Contracting Officer decides that the facts justify it, the Contracting Officer may receive and act upon a proposal submitted before final payment of the contract.
- (d) If the Contractor's proposal includes the cost of property made obsolete or excess by the change, the Contracting Officer shall have the right to prescribe the manner of the disposition of the property.
- (e) Failure to agree to any adjustment shall be a dispute under the Disputes clause. However, nothing in this clause shall excuse the Contractor from proceeding with the contract as changed.

(f) No services for which an additional cost or fee will be charged by the Contractor shall be furnished without the prior written authorization of the Contracting Officer. (End of clause)

121. FAR 52.243-4 CHANGES (AUG 1987)

(a) The Contracting Officer may, at any time, without notice to the sureties, if any, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract, including changes--

- (1) In the specifications (including drawings and designs);
- (2) In the method or manner of performance of the work;
- (3) In the Government-furnished facilities, equipment, materials, services, or site; or
- (4) Directing acceleration in the performance of the work.

(b) Any other written or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating

- (1) the date, circumstances, and source of the order and
- (2) that the Contractor regards the order as a change order.

(c) Except as provided in this clause, no order, statement, or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.

(d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for an adjustment based on defective specifications, no adjustment for any change under paragraph (b) of this clause shall be made for any costs incurred more than 20 days before the Contractor gives written notice as required. In the case of defective specifications for which the Government is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.

(e) The Contractor must assert its right to an adjustment under this clause within 30 days after

- (1) receipt of a written change order under paragraph (a) of this clause or
- (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting to the

Contracting Officer a written statement describing the general nature and amount of the proposal, unless this period is extended by the Government. The statement of proposal for adjustment may be included in the notice under paragraph (b) above.

(f) No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

122. DFARS 252.243-7001 PRICING OF CONTRACT MODIFICATIONS (DEC 1991)

When costs are a factor in any price adjustment under this contract, the contract cost principles and procedures in FAR Part 31 and DRARS Part 231, in effect on the date of this contract, apply.

123. DFARS 252.243-7002 REQUESTS FOR EQUITABLE ADJUSTMENT (MAR 1998)

(a) The amount of any request for equitable adjustment to contract terms shall accurately reflect the contract adjustment for which the Contractor believes the Government is liable. The request shall include only costs for performing the change, and shall not include any costs that already have been reimbursed or that have been separately claimed. All indirect costs included in the request shall be properly allocable to the change in accordance with applicable acquisition regulations.

(b) In accordance with 10 U.S.C. 2410(a), any request for equitable adjustment to contract terms that exceeds the simplified acquisition threshold shall bear, at the time of submission, the following certificate executed by an individual authorized to certify the request on behalf of the Contractor:
I certify that the request is made in good faith, and that the supporting data are accurate and complete to the best of my knowledge and belief.

(Official's Name)

(Title)

(c) The certification in paragraph (b) of this clause requires full disclosure of all relevant facts, including--

(1) Cost or pricing data if required in accordance with subsection 15.403-4 of the Federal Acquisition Regulation; and

(2) Information other than cost or pricing data, in accordance with subsection 15.403-3 of the FAR, including actual cost data and data to support any estimated costs, even if cost or pricing data are not required.

(d) The certification requirement in paragraph (b) of this clause does not apply to----

(1) Requests for routine contract payments; for example, requests for payment for accepted supplies and services, routine vouchers under a cost-reimbursement type contract, or progress payment invoices; or

(2) Final adjustment under an incentive provision of the contract.

(End of clause)

124. *FAR 52.244-2 SUBCONTRACTS (AUG 1998)

(a) Definitions. As used in this clause--

"Approved purchasing system" means a Contractor's purchasing system that has been reviewed and approved in accordance with Part 44 of the Federal Acquisition Regulation (FAR).

"Consent of subcontract" means the Contracting Officer's written consent for the Contractor to enter into a particular subcontract.

"Subcontract," means any contract, as defined in FAR Subpart 2.1, entered into by a subcontractor to furnish supplies or services for performance of the prime contract or a subcontract. It includes, but is not limited to purchase orders, and changes and modifications to purchase orders.

(b) This clause does not apply to subcontracts for special test equipment when the contract contains the clause at FAR 52.245-18, Special Test Equipment.

(c) When this clause is included in a fixed-price type contract, consent to subcontract is required only on unpriced contract actions (including unpriced modification or unpriced delivery orders), and only if required in accordance with paragraph (d) or (e) of this clause.

(d) If the Contractor does not have an approved purchasing system, consent to subcontract is required for any subcontract that--

(1) Is of the cost-reimbursement, time-and-materials, or labor-hour type; or

(2) Is fixed-price and exceeds--

(i) For a contract awarded by the Department of Defense, the Coast Guard, or the National Aeronautics and Space Administration, the greater of the simplified threshold or 5 percent of the total estimated cost of the contract; or

(ii) For a contract awarded by a civilian agency other than the Coast Guard and the National Aeronautics and Space Administration, either the simplified threshold or 5 percent of the total estimated cost of the contract.

(e) If the Contractor has an approved purchasing system, the Contractor nevertheless shall obtain the Contracting Officer's written consent before placing the following subcontracts:

(f)(1) The Contractor shall notify the Contracting Officer reasonably in advance of placing any subcontract or modification thereof for which consent is required under paragraph (c), (d), or (e) of this clause, including the following information:

- (i) A description of the supplies or services to be subcontracted.
- (ii) Identification of the type of subcontract to be used.
- (iii) Identification of the proposed subcontractor.
- (iv) The proposed subcontract price.
- (v) The subcontractor's current, complete, and accurate cost or pricing data and Certificate of Current Cost or Pricing Data, if required by other contract provisions.
- (vi) The subcontractor's Disclosure Statement or Certificate relating to Cost Accounting Standards when such data are required by other provisions of this contract.
- (vii) A negotiation memorandum reflecting--
 - (A) The principal elements of the subcontract price negotiations;
 - (B) The most significant considerations controlling establishment of initial or revised prices;
 - (C) The reason cost or pricing data were or were not required;
 - (D) The extent, if any, to which the Contractor did not rely on the subcontractor's cost or pricing data in determining the price objective and in negotiating the final price;
 - (E) The extent to which it was recognized in the negotiation that the subcontractor's cost or pricing data were not accurate, complete, or current; the action taken by the Contractor and subcontractor; and the effect of any such defective data on the total price negotiated;
 - (F) The reasons for any significant difference between the Contractor's price objective and the price negotiated; and
 - (G) A complete explanation of the incentive fee or profit plan when incentives are used. The explanation shall identify each critical performance element, management decisions used to quantify each incentive element, reasons for the incentives, and a summary of all trade-off possibilities considered.

(2) The Contractor is not required to notify the Contracting Officer in advance of entering into any subcontract for which consent is not required under paragraph (c), (d), or (e) of this clause.

(g) Unless the consent or approval specifically provides otherwise, neither consent by the Contracting Officer to any subcontract nor approval of the Contractor's purchasing system shall constitute a determination--

- (1) Of the acceptability of any subcontract terms or conditions;
- (2) Of the acceptability of any cost under this contract; or
- (3) To relieve the Contractor of any responsibility for performing this contract.

(h) No subcontract or modification thereof placed under this contract shall provide for payment on a cost-plus-a-percentage-of-cost basis, and any fee payable under cost-reimbursement subcontracts shall not exceed the fee limitations in FAR 15.404-4(c)(4)(i).

(i) The Contractor shall give the Contracting Officer immediate written notice of any action or suit filed and prompt notice of any claim made against the Contractor by any subcontractor or vendor that, in the opinion of

the Contractor, may result in litigation related in any way to this contract, with respect to which the Contractor may be entitled to reimbursement by the Government.

(j) The Government reserves the right to review the Contractor's purchasing system as set forth in FAR Subpart 44.3.

(k) Paragraphs (d) and (f) of this clause do not apply to the following subcontracts, which were evaluated during negotiations:

(End of clause)

125. *FAR 52.244-4 SUBCONTRACTORS AND OUTSIDE ASSOCIATES AND CONSULTANTS (ARCHITECT-ENGINEER SERVICES) (AUG 1998)

Any subcontractors and outside associates or consultants required by the Contractor in connection with the services covered by the contract will be limited to individuals or firms that were specifically identified and agreed to during negotiations. The Contractor shall obtain the Contracting Officer's written consent before making any substitution for these subcontractors, associates, or consultants. (End of clause)

126. FAR 52.244-6 SUBCONTRACTS FOR COMMERCIAL ITEMS (MAY 2002)

(a) *Definitions.* As used in this clause—

"Commercial item" has the meaning contained in the clause at 52.202-1, Definitions.

"Subcontract" includes a transfer of commercial items between divisions, subsidiaries, or affiliates of the Contractor or subcontractor at any tier.

(b) To the maximum extent practicable, the Contractor shall incorporate, and require its subcontractors at all tiers to incorporate, commercial items or nondevelopmental items as components of items to be supplied under this contract.

(c)(1) The Contractor shall insert the following clauses in subcontracts for commercial items:

(i) 52.219-8, Utilization of Small Business Concerns (Oct 2000) (15 U.S.C. 637(d)(2) and (3)), in all subcontracts that offer further subcontracting opportunities. If the subcontract (except subcontracts to small business concerns) exceeds \$500,000 (\$1,000,000 for construction of any public facility), the subcontractor must include 52.219-8 in lower tier subcontracts that offer subcontracting opportunities.

(ii) 52.222-26, Equal Opportunity (Apr 2002) (E.O. 11246).

(iii) 52.222-35, Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (Dec 2001) (38 U.S.C. 4212(a));

(iv) 52.222-36, Affirmative Action for Workers with Disabilities (June 1998) (29 U.S.C. 793).

(v) 52.247-64, Preference for Privately Owned U.S.-Flag Commercial Vessels (June 2000) (46 U.S.C. Appx 1241) (flowdown not required for subcontracts awarded beginning May 1, 1996).

(2) While not required, the Contractor may flow down to subcontracts for commercial items a minimal number of additional clauses necessary to satisfy its contractual obligations.

(d) The Contractor shall include the terms of this clause, including this paragraph (d), in subcontracts awarded under this contract. (End of clause)

127. *FAR 52.245-2 GOVERNMENT PROPERTY (FIXED-PRICE CONTRACTS) (DEC 1989) [For Government Property over \$100,000]

(a) Government-furnished property.

(1) The Government shall deliver to the Contractor, for use in connection with and under the terms of this contract, the Government-furnished property described in the Schedule or specifications together with any related data and information that the Contractor may request and is reasonably required for the intended use of the property (hereinafter referred to as "Government-furnished property").

(2) The delivery or performance dates for this contract are based upon the expectation that Government-furnished property suitable for use (except for property furnished "as is") will be delivered to the Contractor at the times stated in the Schedule or, if not so stated, in sufficient time to enable the Contractor to meet the contract's delivery or performance dates.

(3) If Government-furnished property is received by the Contractor in a condition not suitable for the intended use, the Contractor shall, upon receipt of it, notify the Contracting Officer, detailing the facts, and, as directed by the Contracting Officer and at Government expense, either repair, modify, return, or otherwise dispose of the property. After completing the directed action and upon written request of the Contractor, the Contracting Officer shall make an equitable adjustment as provided in paragraph (h) of this clause.

(4) If Government-furnished property is not delivered to the Contractor by the required time, the Contracting Officer shall, upon the Contractor's timely written request, make a determination of the delay, if any, caused the Contractor and shall make an equitable adjustment in accordance with paragraph (h) of this clause.

(b) Changes in Government-furnished property.

(1) The Contracting Officer may, by written notice,

(i) decrease the Government-furnished property provided or to be provided under this contract, or

(ii) substitute other Government-furnished property for the property to be provided by the Government, or to be acquired by the Contractor for the Government, under this contract. The Contractor shall promptly take such action as the Contracting Officer may direct regarding the removal, shipment, or disposal of the property covered by such notice.

(2) Upon the Contractor's written request, the Contracting Officer shall make an equitable adjustment to the contract in accordance with paragraph (h) of this clause, if the Government has agreed in the Schedule to make the property available for performing this contract and there is any--

(i) Decrease or substitution in this property pursuant to subparagraph (b)(1) above; or

(ii) Withdrawal of authority to use this property, if provided under any other contract or lease.

(c) Title in Government property.

(1) The Government shall retain title to all Government-furnished property.

(2) All Government-furnished property and all property acquired by the Contractor, title to which vests in the Government under this paragraph (collectively referred to as "Government property"), are subject to the provisions of this clause. However, special tooling accountable to this contract is subject to the provisions of the Special Tooling clause and is not subject to the provisions of this clause. Title to Government property shall not be affected by its incorporation into or attachment to any property not owned by the Government, nor shall government property become a fixture or lose its identity as personal property by being attached to any real property.

(3) Title to each item of facilities and special test equipment acquired by the Contractor for the Government under this contract shall pass to and vest in the Government when its use in performing this contract commences or when the Government has paid for it, whichever is earlier, whether or not title previously vested in the Government.

(4) If this contract contains a provision directing the Contractor to purchase material for which the Government will reimburse the Contractor as a direct item of cost under this contract--

(i) Title to material purchased from a vendor shall pass to and vest in the Government upon the vendor's delivery of such material; and

(ii) Title to all other material shall pass to and vest in the Government upon--
(A) Issuance of the material for use in contract performance;
(B) Commencement of processing of the material or its use in contract performance; or

(C) Reimbursement of the cost of the material by the Government, whichever occurs first.

(d) Use of Government property. The Government property shall be used only for performing this contract, unless otherwise provided in this contract or approved by the Contracting Officer.

(e) Property Administration.

(1) The Contractor shall be responsible and accountable for all Government property provided under this contract and shall comply with Federal Acquisition Regulation (FAR) Subpart 45.5, as in effect on the date of this contract.

(2) The Contractor shall establish and maintain a program for the use, maintenance, repair, protection, and preservation of Government property in accordance with sound industrial practice and the applicable provisions of Subpart 45.5 of the FAR.

(3) If damage occurs to Government property, the risk of which has been assumed by the Government under this contract, the Government shall replace the items or the Contractor shall make such repairs as the Government directs. However, if the Contractor cannot effect such repairs within the time required, the Contractor shall dispose of the property as directed by the Contracting Officer. When any property for which the Government is responsible is replaced or repaired, the Contracting Officer shall make an equitable adjustment in accordance with paragraph (h) of this clause.

(4) The Contractor represents that the contract price does not include any amount for repairs or replacement for which the Government is responsible. Repair or replacement of property for which the Contractor is responsible shall be accomplished by the Contractor at its own expense.

(f) Access. The Government and all its designees shall have access at all reasonable times to the premises in which any Government property is located for the purpose of inspecting the Government property.

(g) Risk of loss. Unless otherwise provided in this contract, the Contractor assumes the risk of, and shall be responsible for, any loss or destruction of, or damage to, Government property upon its delivery to the Contractor or upon passage of title to the Government under paragraph (c) of this clause. However, the Contractor is not responsible for reasonable wear and tear to Government property or for Government property properly consumed in performing this contract.

(h) Equitable adjustment. When this clause specifies an equitable adjustment, it shall be made to any affected contract provision in accordance with the procedures of the Changes clause. When appropriate, the Contracting Officer may initiate an equitable adjustment in favor of the Government. The right to an equitable adjustment shall be the Contractor's exclusive remedy. The Government shall not be liable to suit for breach of contract for--

- (1) Any delay in delivery of Government-furnished property;
- (2) Delivery of Government-furnished property in a condition not suitable for its intended use;
- (3) A decrease in or substitution of Government-furnished property; or
- (4) Failure to repair or replace Government property for which the Government is responsible.

(i) Final accounting and disposition of Government property. Upon completing this contract, or at such earlier dates as may be fixed by the Contracting Officer, the Contractor shall submit, in a form acceptable to the Contracting Officer, inventory schedules covering all items of Government property (including any resulting scrap) not consumed in performing this contract or delivered to the Government. The Contractor shall prepare for shipment, deliver f.o.b. origin, or dispose of the Government property as may be directed or authorized by the Contracting Officer. The net proceeds of any such disposal shall be credited to the contract price or shall be paid to the Government as the Contracting Officer directs.

(j) Abandonment and restoration of Contractor's premises. Unless otherwise provided herein, the Government--

(1) May abandon any Government property in place, at which time all obligations of the Government regarding such abandoned property shall cease; and

(2) Has no obligation to restore or rehabilitate the Contractor's premises under any circumstances (e.g., abandonment, disposition upon completion of need, or upon contract completion). However, if the Government-furnished property (listed in the Schedule or specifications) is withdrawn or is unsuitable for the intended use, or if other Government property is substituted, then the equitable adjustment under paragraph (h) of this clause may properly include restoration or rehabilitation costs.

(k) Communications. All communications under this clause shall be in writing.

(l) Overseas contracts. If this contract is to be performed outside of the United States of America, its territories, or possessions, the words "Government" and "Government-furnished" (wherever they appear in this clause) shall be construed as "United States Government" and "United States Government-furnished," respectively.

128. *FAR 52.245-4 GOVERNMENT-FURNISHED PROPERTY (SHORT FORM) (APR 1984)
[For Government Property \$100,000 or Less]

(a) The Government shall delivery to the Contractor, at the time and locations stated in this contract, the Government-furnished property described in the Schedule or specifications. If that property, suitable for its intended use, is not delivered to the Contractor, the Contracting Officer shall equitably adjust affected provisions of this contract in accordance with the Changed clause when--

- (1) The Contractor submits a timely written request for an equitable adjustment; and
- (2) The facts warrant an equitable adjustment.

(b) Title to Government-furnished property shall remain in the Government. The Contractor shall use the Government-furnished property only in connection with this contract. The Contractor shall maintain adequate property control records in accordance with sound industrial practice and will make such records available for Government inspection at all reasonable times, unless the clause at Federal Acquisition Regulation 52.245-1, Property Records, is included in this contract.

(c) Upon delivery of Government-furnished property to the Contractor, the Contractor assumes the risk and responsibility for its loss or damage, except--

- (1) For reasonable wear and tear;
- (2) To the extent property is consumed in performing this contract; or
- (3) As otherwise provided for by the provisions of this contract.

(d) Upon completing this contract, the Contractor shall follow the instructions of the Contracting Officer regarding the disposition of all Government-furnished property not consumed in performing this contract or previously delivered to the Government. The Contractor shall prepare for shipment, deliver f.o.b. origin, or dispose of the Government property, as may be directed or authorized by the Contracting Officer. The net proceeds of any such disposal shall be credited to the contract price or shall be paid to the Government as directed by the Contracting Officer.

(e) If this contract is to be performed outside the United States of America, its territories, or possessions, the words "Government" and "Government-furnished" (wherever they appear in this clause) shall be construed as "United States Government" and "United States Government-furnished," respectively.

129. *FAR 52.246-12 INSPECTION OF CONSTRUCTION (AUG 1996)

(a) Definition. "Work" includes, but is not limited to, materials, workmanship, and manufacture and fabrication of components.

(b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. The Contractor shall maintain complete inspection records and make them available to the Government. All work shall be conducted under the general direction of the Contracting Officer and is subject to Government inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.

(c) Government inspections and tests are for the sole benefit of the Government and do not--

- (1) Relieve the Contractor of responsibility for providing adequate quality control measures;
- (2) Relieve the Contractor of responsibility for damage to or loss of the material before

acceptance;

- (3) Constitute or imply acceptance; or

(4) Affect the continuing rights of the Government after acceptance of the completed work under paragraph (i) below.

(d) The presence or absence of a Government inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specification without the Contracting Officer's written authorization.

(e) The Contractor shall promptly furnish, at no increase in contract price, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the

Contracting Officer. The Government may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The Government shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.

(f) The Contractor shall, without charge, replace or correct work found by the Government not to conform to contract requirements, unless in the public interest the Government consents to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

(g) If the Contractor does not promptly replace or correct rejected work, the Government may

(1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor
or

(2) Terminate for default the Contractor's right to proceed.

(h) If, before acceptance of the entire work, the Government decides to examine already completed work by removing it or tearing it out, the Contractor, on request, shall promptly furnish all necessary facilities, labor, and material. If the work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray the expenses of the examination and of satisfactory reconstruction. However, if the work is found to meet contract requirements, the Contracting Officer shall make an equitable adjustment for the additional services involved in the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.

(i) Unless otherwise specified in the contract, the Government shall accept, as promptly as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the Government's rights under any warranty or guarantee.

130. *FAR 52.246-21 WARRANTY OF CONSTRUCTION (MAR 1994)

(a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (i) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

(b) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

(c) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of--

(1) The Contractor's failure to conform to contract requirements; or

(2) Any defect of equipment, material, workmanship, or design furnished.

(d) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

(e) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

(f) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

(g) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--

(1) Obtain all warranties that would be given in normal commercial practice;

(2) Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and

(3) Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

(h) In the event the Contractor's warranty under paragraph (b) of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

(i) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

(j) This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

131. DFARS 252.247-7023 TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)

(a) Definitions.

As used in this clause--

(1) "Components" means articles, materials, and supplies incorporated directly into end products at any level of manufacture, fabrication, or assembly by the Contractor or any subcontractor.

(2) "Department of Defense" (DOD) means the Army, Navy, Air Force, Marine Corps, and defense agencies.

(3) "Foreign flag vessel" means any vessel that is not a U.S.-flag vessel.

(4) "Ocean transportation" means any transportation aboard a ship, vessel, boat, barge, or ferry through international waters.

(5) "Subcontractor" means a supplier, materialman, distributor, or vendor at any level below the prime Contractor whose contractual obligation to perform results from, or is conditioned upon, award of the prime contract and who is performing any part of the work or other requirement of the prime contract.

(6) "Supplies" means all property, except land and interests in land, that is clearly identifiable for eventual use by or owned by the DoD at the time of transportation by sea.

(i) An item is clearly identifiable for eventual use by the DoD if, for example, the contract documentation contains a reference to a DoD contract number or a military destination.

(ii) "Supplies" includes (but is not limited to) public works; buildings and facilities; ships; floating equipment and vessels of every character, type, and description, with parts, subassemblies, accessories, and equipment; machine tools; material; equipment; stores of all kinds; end items; construction materials; and components of the foregoing.

(7) "U.S.-flag vessel" means a vessel of the United States or belonging to the United States, including any vessel registered or having national status under the laws of the United States.

(b) (1) The Contractor shall use U.S. -flag vessels when transporting any supplies by sea under this contract.

(2) A subcontractor transporting supplies by sea under this contract shall use U.S.-flag vessel if--

(i) This Contract is a construction contract; or

(ii) The supplies being transported are-

(A) Noncommercial items; or

(B) Commercial items that-

- (1) The Contractor is reselling or distributing to the Government without adding value (generally, the Contractor does not add value to items that it subcontracts for f.o.b. destination shipment);
- (2) Are shipped in direct support of U.S. military contingency operations, exercises, or forces deployed in humanitarian or peacekeeping operations; or
- (3) Are commissary or exchange cargoes transported outside of the Defense Transportation System in accordance with 10 U.S.C. 2643.

(c) The Contractor and its subcontractors may request that the Contracting Officer authorize shipment in foreign-flag vessels, or designate available U.S.-flag vessels, if the Contractor or a subcontractor believes that--

- (1) U.S.-flag vessels are not available for timely shipment;
- (2) The freight charges are inordinately excessive or unreasonable; or
- (3) Freight charges are higher than charges to private persons for transportation of like goods.

(d) The Contractor must submit any request for use of other than U.S.-flag vessels in writing to the Contracting Officer at least 45 days prior to the sailing date necessary to meet its delivery schedules. The Contracting Officer will process requests submitted after such date(s) as expeditiously as possible, but the Contracting Officer's failure to grant approvals to meet the shipper's sailing date will not of itself constitute a compensable delay under this or any other clause of this contract. Requests shall contain at a minimum--

- (1) Type, weight, and cube of cargo;
- (2) Required shipping date;
- (3) Special handling and discharge requirements;
- (4) Loading and discharge points;
- (5) Name of shipper and consignee;
- (6) Prime contract number, and
- (7) A documented description of efforts made to secure U.S.-flag vessels, including points of

contact (with names and telephone numbers) with at least two U.S.-flag carriers contacted. Copies of telephone notes, telegraphic and facsimile message or letters will be sufficient for this purpose.

(e) The Contractor shall, within 30 days after each shipment covered by this clause, provide the Contracting Officer and the Division of National Cargo, Office of Market Development, Maritime Administration, U.S. Department of Transportation, Washington, DC 20590, one copy of the rated on board vessel operating carrier's ocean bill of lading, which shall contain the following information--

- (1) Prime contract number;
- (2) Name of vessel;
- (3) Vessel flag of registry;
- (4) Date of loading;
- (5) Port of loading;
- (6) Port of final discharge;
- (7) Description of commodity;
- (8) Gross weight in pounds and cubic feet if available;
- (9) Total ocean freight in U.S. dollars; and
- (10) Name of the steamship company.

(f) The Contractor agrees to provide with its final invoice under this contract a representation that to the best of its knowledge and belief--

- (1) No ocean transportation was used in the performance of this contract;
- (2) Ocean transportation was used and only U.S.-flag vessels were used for all ocean shipments under the contract;
- (3) Ocean transportation was used, and the Contractor had the written consent of the Contracting Officer for all non-U.S.-flag ocean transportation; or
- (4) Ocean transportation was used and some or all of the shipments were made on non-U.S.-flag vessels without the written consent of the Contracting Officer. The Contractor shall describe these shipments in the following format;

ITEM DESCRIPTION	CONTRACT LINE ITEMS	QUANTITY
---------------------	------------------------	----------

TOTAL

(g) If the final invoice does not include the required representation, the Government will reject and return it to the Contractor as an improper invoice for the purposes of the Prompt Payment clause of this contract. In the event there has been unauthorized use of non-U.S.-flag vessels in the performance of this contract, the Contracting Officer is entitled to equitably adjust the contract, based on the unauthorized use.

(h) The Contractor shall include this clause, including this paragraph (h) in all subcontracts under this contract that-

- (1) Exceed the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation; and
- (2) Are for a type of supplies described in paragraph (b) (2) of this clause.

132. DFARS 252.247-7024 NOTIFICATION OF TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)

(a) The Contractor has indicated by the response to the solicitation provision, Representation of Extent of Transportation by Sea, that it did not anticipate transporting by sea any supplies. If, however, after the award of this contract, the Contractor learns that supplies, as defined in the Transportation of Supplies by Sea clause of this contract, will be transported by sea, the Contractor--

- (1) Shall notify the Contracting Officer of that fact; and
- (2) Hereby agrees to comply with all the terms and conditions of the Transportation of Supplies by Sea clause of this contract.

(b) (1) The Contractor shall use U.S. -flag vessels when transporting any supplies by sea under this contract.

(2) A subcontractor transporting supplies by sea under this contract shall use U.S.-flag vessel if--

(i) This Contract is a construction contract; or

(ii) The supplies being transported are-

(A) Noncommercial items; or

(B) Commercial items that-

- (1) The Contractor is reselling or distributing to the Government without adding value (generally, the Contractor does not add value to items that it subcontracts for f.o.b. destination shipment);
- (2) Are shipped in direct support of U.S. military contingency operations, exercises, or forces deployed in humanitarian or peacekeeping operations; or
- (3) Are commissary or exchange cargoes transported outside of the Defense Transportation System in accordance with 10 U.S.C. 2643.

**133. ~~DELETED FAR 52.248-3~~ ~~VALUE ENGINEERING CONSTRUCTION (FEB 2000)~~
(~~ALTERNATE I (APR 1984)~~)**

~~(a) General. The Contractor is encouraged to develop, prepare, and submit value engineering change proposals (VECP's) voluntarily. The Contractor shall share in any instant contract savings realized from accepted VECP's, in accordance with paragraph (f) of this clause.~~

~~(b) Definitions. "Collateral costs," as used in this clause, means agency costs of operation, maintenance, logistic support, or Government furnished property.~~

"Collateral savings," as used in this clause, means those measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

"Contractor's development and implementation costs," as used in this clause, means those costs the Contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the Contractor incurs to make the contractual changes required by Government acceptance of a VECP.

"Government costs," as used in this clause, means those agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistic support. The term does not include the normal administrative costs of processing the VECP.

"Instant contract savings," as used in this clause, means the estimated reduction in Contractor cost of performance resulting from acceptance of the VECP, minus allowable Contractor's development and implementation costs, including subcontractors' development and implementation costs (see paragraph (h) of this clause).

"Value engineering change proposal (VECP)" means a proposal that—

(1) Requires a change to this, the instant contract, to implement; and

(2) Results in reducing the contract price or estimated cost without impairing essential functions or characteristics; provided, that it does not involve a change—

(i) In deliverable end item quantities only; or

(ii) To the contract type only.

(c) VECP preparation. As a minimum, the Contractor shall include in each VECP the information described in paragraphs (e) (1) through (7) of this clause. If the proposed change is affected by contractually required configuration management or similar procedures, the instructions in those procedures relating to format, identification, and priority assignment shall govern VECP preparation. The VECP shall include the following:

(1) A description of the difference between the existing contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, and the effect of the change on the end item's performance.

(2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revisions.

(3) A separate, detailed cost estimate for—

(i) the affected portions of the existing contract requirement and

(ii) the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under paragraph (h) of this clause.

(4) A description and estimate of costs the Government may incur in implementing the VECP, such as test and evaluation and operating and support costs.

(5) A prediction of any effects the proposed change would have on collateral costs to the agency.

(6) A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.

(7) Identification of any previous submissions of the VECP, including the dates submitted, the agencies and contract numbers involved, and previous Government actions, if known.

(d) Submission. The Contractor shall submit VECP's to the Resident Engineer at the worksite, with a copy to the Contracting Officer.

(e) Government action:

(1) The Contracting Officer will notify the Contractor of the status of the VECP within 45 calendar days after the contracting office receives it. If additional time is required, the Contracting Officer will notify the Contractor within the 45-day period and provide the reason for the delay and the expected date of the decision. The Government will process VECP's expeditiously; however, it will not be liable for any delay in acting upon a VECP.

(2) If the VECP is not accepted, the Contracting Officer will notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Government. The Contracting Officer may require that the Contractor provide written notification before undertaking significant expenditures for VECP effort.

~~(3) Any VECP may be accepted, in whole or in part, by the Contracting Officer's award of a modification to this contract citing this clause. The Contracting Officer may accept the VECP, even though an agreement on price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a notice to proceed is issued or a contract modification applied a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The decision to accept or reject all or part of any VECP is a unilateral decision made solely at the discretion of the Contracting Officer.~~

~~(f) Sharing.~~

~~(1) Rates. The Government's share of savings is determined by subtracting Government costs from instant contract savings and multiplying the result by—~~

~~(i) 45 percent for fixed price contracts or~~

~~(ii) 75 percent for cost reimbursement contracts.~~

~~(2) Payment. Payment of any share due the Contractor for use of a VECP on this contract shall be authorized by a modification to this contract to—~~

~~(i) Accept the VECP;~~

~~(ii) Reduce the contract price or estimated cost by the amount of instant contract savings; and~~

~~(iii) Provide the Contractor's share of savings by adding the amount calculated to the contract price or fee.~~

~~(g) Deleted.~~

~~(h) Subcontracts. The Contractor shall include an appropriate value engineering clause in any subcontract of \$50,000 or more and may include one in subcontracts of lesser value. In computing any adjustment in this contract's price under paragraph (f) of this clause, the Contractor's allowable development and implementation costs clearly resulting from a VECP accepted by the Government under this contract, but shall exclude any value engineering incentive payments to a subcontractor. The Contractor may choose any arrangement for subcontractor value engineering incentive payments; provided, that these payments shall not reduce the Government's share of the savings resulting from the VECP.~~

~~(i) Data. The Contractor may restrict the Government's right to use any part of a VECP or the supporting data by marking the following legend on the affected parts:~~

~~"These data, furnished under the Value Engineering Construction clause of contract _____, shall not be disclosed outside the Government or duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate a value engineering change proposal submitted under the clause. This restriction does not limit the Government's right to use information contained in these data if it has been obtained or is otherwise available from the Contractor or from another source without limitations."~~

~~If a VECP is accepted, the Contractor hereby grants the Government unlimited rights in the VECP and supporting data, except that, with respect to data qualifying and submitted as limited rights technical data, the Government shall have the rights specified in the contract modification implementing the VECP and shall appropriately mark the data. (The terms "unlimited rights" and "limited rights" are defined in Part 27 of the Federal Acquisition Regulation.)~~

~~_____(End of Clause)~~

**134. *FAR 52.249-2 TERMINATION FOR CONVENIENCE OF THE GOVERNMENT
(FIXED-PRICE) ALTERNATE I (SEP 1996) [For Contracts Over \$100,000]**

(a) The Government may terminate performance of work under this contract in whole or, from time to time, in part if the Contracting Officer determines that a termination is in the Government's interest. The Contracting Officer shall terminate by delivering to the Contractor a Notice of Termination specifying the extent of termination and the effective date.

(b) After receipt of a Notice of Termination, and except as directed by the Contracting Officer, the Contractor shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this clause:

- (1) Stop work as specified in the notice.
- (2) Place no further subcontracts or orders (referred to as subcontracts in this clause) for materials, services, or facilities, except as necessary to complete the continued portion of the contract.
- (3) Terminate all subcontracts to the extent they relate to the work terminated.
- (4) Assign to the Government, as directed by the Contracting Officer, all right, title, and interest of the Contractor under the subcontracts terminated, in which case the Government shall have the right to settle or to pay any termination settlement proposal arising out of those terminations.
- (5) With approval or ratification to the extent required by the Contracting Officer, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts; the approval or ratification will be final for purposes of this clause.
- (6) As directed by the Contracting Officer, transfer title and deliver to the Government
 - (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced or acquired for the work terminated, and
 - (ii) the completed or partially completed plans, drawings, information, and other property that, if the contract had been completed, would be required to be furnished to the Government.
- (7) Complete performance of the work not terminated.
- (8) Take any action that may be necessary, or that the Contracting Officer may direct, for the protection and preservation of the property related to this contract that is in the possession of the Contractor and in which the Government has or may acquire an interest.
- (9) Use its best efforts to sell, as directed or authorized by the Contracting Officer, any property of the types referred to in subparagraph (b) (6) of this clause; provided, however, that the Contractor
 - (i) is not required to extend credit to any purchaser and
 - (ii) may acquire the property under the conditions prescribed by, and at prices approved by, the Contracting Officer. The proceeds of any transfer or disposition will be applied to reduce any payments to be made by the Government under this contract, credited to the price or cost of the work, or paid in any other manner directed by the Contracting Officer.
- (c) The Contractor shall submit complete termination inventory schedules no later than 120 days from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 120-day period.
- (d) After expiration of the plant clearance period as defined in Subpart 45.6 of the Federal Acquisition Regulation, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of termination inventory not previously disposed of, excluding items authorized for disposition by the Contracting Officer. The Contractor may request the Government to remove those items or enter into an agreement for their storage. Within 15 days, the Government will accept title to those items and remove them or enter into a storage agreement. The Contracting Officer may verify the list upon removal of the items, or if stored, within 45 days from submission of the list, and shall correct the list, as necessary, before final settlement.
- (e) After termination, the Contractor shall submit a final termination settlement proposal to the Contracting Officer in the form and with the certification prescribed by the Contracting Officer. The Contractor shall submit the proposal promptly, but no later than 1 year from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 1 year period. However, if the Contracting Officer determines that the facts justify it, a termination settlement proposal may be received and acted on after 1 year or any extension. If the Contractor fails to submit the proposal within the time allowed, the Contracting Officer may determine, on the basis of information available, the amount, if any, due the Contractor because of the termination and shall pay the amount determined.
- (f) Subject to paragraph (e) of this clause, the Contractor and the Contracting Officer may agree upon the whole or any part of the amount to be paid because of the termination. The amount may include a reasonable allowance for profit on work done. However, the agreed amount, whether under this paragraph (f) or paragraph (g) of this clause, exclusive of costs shown in subparagraph (g)(3) of this clause, may not exceed the total contract price as reduced by (1) the amount of payments previously made and (2) the contract price of work not terminated. The contract shall be amended, and the Contractor paid the agreed amount. Paragraph (f) of this clause shall not limit, restrict, or affect the amount that may be agreed upon to be paid under this paragraph.
- (g) If the Contractor and the Contracting Officer fail to agree on the whole amount to be paid the Contractor because of the termination of work, the Contracting Officer shall pay the Contractor the amounts determined as follows, but without duplication of any amounts agreed upon under paragraph (f) of this clause:

(1) For contract work performed before the effective date of the termination, the total (without duplication of any items) of--

(i) The cost of this work;
(ii) The cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the contract if not included in subdivision (g)(1)(i) of this clause; and

(iii) A sum, as profit on subdivision (g)(1)(i) of this clause, determined by the Contracting Officer under 49.202 of the Federal Acquisition Regulation, in effect on the date of this contract, to be fair and reasonable; however, if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, the Contracting Officer shall allow no profit under this subdivision (iii) and shall reduce the settlement to reflect the indicated rate of loss.

(2) The reasonable costs of settlement of the work terminated, including--

(i) Accounting, legal, clerical, and other expenses reasonably necessary for the preparation of termination settlement proposals and supporting data;
(ii) The termination and settlement of subcontracts (excluding the amounts of such settlements); and

(iii) Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory.

(h) Except for normal spoilage, and except to the extent that the Government expressly assumed the risk of loss, the Contracting Officer shall exclude from the amounts payable to the Contractor under paragraph (g) of this clause, the fair value, as determined by the Contracting Officer, of property that is destroyed, lost, stolen, or damaged so as to become undeliverable to the Government or to a buyer.

(i) The cost principles and procedures of Part 31 of the Federal Acquisition Regulation, in effect on the date of this contract, shall govern all costs claimed, agreed to, or determined under this clause.

(j) The Contractor shall have the right of appeal, under the Disputes clause, from any determination made by the Contracting Officer under paragraph (e), (g), or (l) of this clause, except that if the Contractor failed to submit the termination settlement proposal within the time provided in paragraph (e) or (l), respectively, and failed to request a time extension, there is no right of appeal.

(k) In arriving at the amount due the Contractor under this clause, there shall be deducted--

(1) All unliquidated advance or other payments to the Contractor under the terminated portion of this contract;

(2) Any claim which the Government has against the Contractor under this contract; and

(3) The agreed price for, or the proceeds of sale of, materials, supplies, or other things acquired by the Contractor or sold under the provisions of this clause and not recovered by or credited to the Government.

(l) If the termination is partial, the Contractor may file a proposal with the Contracting Officer for an equitable adjustment of the price(s) of the continued portion of the contract. The Contracting Officer shall make any equitable adjustment agreed upon. Any proposal by the Contractor for an equitable adjustment under this clause shall be requested within 90 days from the effective date of termination unless extended in writing by the Contracting Officer.

(m) (1) The Government may, under the terms and conditions it prescribes, make partial payments and payments against costs incurred by the Contractor for the terminated portion of the contract, if the Contracting Officer believes the total of these payments will not exceed the amount to which the Contractor will be entitled.

(2) If the total payments exceed the amount finally determined to be due, the Contractor shall repay the excess to the Government upon demand, together with interest computed at the rate established by the Secretary of the Treasury under 50 U.S.C. App. 1215(b)(2). Interest shall be computed for the period from the date the excess payment is received by the Contractor to the date the excess is repaid. Interest shall not be charged on any excess payment due to a reduction in the Contractor's termination settlement proposal because of retention or other disposition of termination inventory until 10 days after the date of the retention or disposition, or a later date determined by the Contracting Officer because of the circumstances.

(n) Unless otherwise provided in this contract or by statute, the Contractor shall maintain all records and documents relating to the terminated portion of this contract for 3 years after final settlement. This includes all books and other evidence bearing on the Contractor's costs and expenses under this contract. The Contractor shall make these records and documents available to the Government, at the Contractor's office, at all reasonable times,

without any direct charge. If approved by the Contracting Officer, photographs, microphotographs, or other authentic reproductions may be maintained instead of original records and documents.

135. *FAR 52.249-10 DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984)

(a) If the Contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified in this contract including any extension, or fails to complete the work within this time, the Government may, by written notice to the Contractor, terminate the right to proceed with the work (or the separable part of the work) that has been delayed. In this event, the Government may take over the work and complete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the Government resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Government in completing the work.

(b) The Contractor's right to proceed shall not be terminated nor the Contractor charged with damages under this clause, if-

(1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include

- (i) acts of God or of the public enemy,
- (ii) acts of the Government in either its sovereign or contractual capacity,
- (iii) acts of another Contractor in the performance of a contract with the Government,
- (iv) fires,
- (v) floods,
- (vi) epidemics,
- (vii) quarantine restrictions,
- (viii) strikes,
- (ix) freight embargoes,
- (x) unusually severe weather, or
- (xi) delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and

(2) The Contractor, within 10 days from the beginning of any delay (unless extended by the Contracting Officer), notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, the time for completing the work shall be extended. The findings of the Contracting Officer shall be final and conclusive on the parties, but subject to appeal under the Disputes clause.

(c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the Government.

(d) The rights and remedies of the Government in this clause are in addition to any other rights and remedies provided by law or under this contract.

136. ENVIRONMENTAL LITIGATION (1974 NOV OCE)

(a) If the performance of all or any part of the work is suspended, delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, the Contracting Officer, at the request of the Contractor, shall determine whether the order is due in any part to the acts or omissions of the Contractor or a Subcontractor at any tier not required by the terms of this contract. If it is determined that the order is not due in any part to acts or omissions of the Contractor or a Subcontractor at any tier other than as required by the terms of this contract, such suspension, delay, or interruption shall be considered as if ordered by the Contracting Officer in the administration of this contract under the terms of the "Suspension of Work" clause of this

contract. The period of such suspension, delay, or interruption shall be considered unreasonable, and an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) as provided in that clause, subject to all the provisions thereof.

(b) The term "environmental litigation," as used herein, means a lawsuit alleging that the work will have an adverse effect on the environment or that the Government has not duly considered, either substantively or procedurally, the effect of the work on the environment.

137. EFARS 52.249-5000 BASIS FOR SETTLEMENT OF PROPOSALS

Actual costs will be used to determine equipment cost for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a termination settlement proposal using the total cost basis, the following principles will be applied to determine allowable equipment costs:

(1) Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the contractor's accounting records to determine total actual equipment costs.

(2) If equipment costs have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.

(3) Recorded job costs adjusted for unallowable and unallocable expenses will be used to determine equipment operating expenses.

(4) Ownership costs (depreciation) will be determined using the contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).

(5) License, taxes, storage and insurance costs are normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recovered through the indirect expense rate.

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DIVISION 00 - DOCUMENTS

SECTION 00800

SPECIAL CONTRACT REQUIREMENTS

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SECTION 00800

SPECIAL CONTRACT REQUIREMENTS
5/00, Rev 7/02

PART 1 GENERAL

Attachments:

General Wage Decision Nos:CO020012(Heavy);CO020014(Highway); CO020006
(Building)

1.1 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to (a) commence work under this contract within ten (10) calendar days after the date of receipt by him of Notice to Proceed, (b) prosecute said work diligently, and (c) complete the entire work ready for use not later than the number of calendar days (which includes design, design reviews and all construction activities) indicated on the awarded Standard Form SF 1442 (Page 00010-1) for this contract. The time stated for completion of the project shall include final cleanup of the premises. (FAR 52.211-10)

1.1.1 Sequence of Design-Construction

(a) After receipt of the Contract Notice to Proceed (NTP), the Contractor shall initiate design, comply with all design submission requirements as covered in Division 01 General Requirements of the advertised Solicitation, and obtain Government review of each submission. No construction may be started until the Government reviews the 100 Percent Corrected Design submission and determines it satisfactory for purposes of beginning construction. The Contractor has the option to submit the design as an entirely complete design package (design analysis, plans and specifications) or as two (2) separate complete design packages (design analysis, plans and specifications), one for the site work and utilities and one for all other work. Each package will require the same design submittals, design reviews and design review conferences as set forth in the Contract. The Government will not grant any time extension for any design resubmittal required when, in the opinion of the Contracting Officer, the initial submission failed to meet the minimum quality requirements as set forth in the Contract.

(b) If the Government allows the Contractor to proceed with limited construction based on pending minor revisions to the reviewed 100 Percent Corrected Design submission, no payment will be made for any in-place construction related to the pending revisions until they are completed, resubmitted and are satisfactory to the Government.

1.2 LIQUIDATED DAMAGES-CONSTRUCTION (SEPT 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of \$790.00 for each calendar day of delay until the work is completed or accepted.

(b) If the Government terminates the Contractor's right to proceed,

liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause. (FAR 52.211-12)

1.3 EXCEPTION TO COMPLETION TIME AND LIQUIDATED DAMAGES

In case the Contracting Officer determines that seeding, sodding, and/or planting and/or the specified maintenance thereof is not feasible during the construction period, such work will be excepted from the completion time and liquidated damages. This work shall be accomplished during the first seeding, sodding, and/or planting period and the specified maintenance period following the completion date, and the warranty for that portion of the work will begin from the date that those plantings are accepted by the Government.

1.4 NOT USED

1.5 DESIGN-BUILD CONTRACT - ORDER OF PRECEDENCE

(a) The contract includes the standard contract clauses and schedules current at the time of contract award. It entails (1) the solicitation in its entirety, including all drawings, cuts, and illustrations, and any amendments, and (2) the successful offeror's accepted proposal. The contract constitutes and defines the entire agreement between the Contractor and the Government. No documentation shall be omitted which in any way bears upon the terms of that agreement.

(b) In the event of conflict or inconsistency between any of the provisions of this contract, precedence shall be given in the following order:

(1) Betterments: Any portion of the accepted proposal, which both conform to and exceed the provisions of the solicitation. "Betterment" is defined as any product, component, or system, which exceeds the requirements stated in the solicitation.

(2) The provisions of the solicitation. (See also Contract Clause entitled "SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION".)

(3) All other provisions of the accepted proposal.

(4) Any design products including, but not limited to, plans, specifications, engineering studies and analyses, shop drawings, equipment installation drawings, etc.. These are "deliverable" under the contract and are not part of the contract itself. Design products must conform with all the provisions of the contract, in the order of precedence herein.

(c) Where conflicts between the solicitation requirements and the UFGS guide specifications (available as indicated in Section 01332 Submittals During Design) exist, the solicitation requirements shall take precedence. Any installation requirements within solicitation requirements, but not contained in the UFGS guide specifications, shall be added to the specifications or shown on the drawings.

1.6 RESPONSIBILITY OF THE CONTRACTOR FOR DESIGN

(a) The Contractor shall be responsible for the professional quality,

technical accuracy, and the coordination of all designs, drawings, specifications, and any other non-construction services furnished by the Contractor under this contract. The Contractor shall, without additional compensation, correct or revise any errors or deficiency in its designs, drawings, specifications, and other non-construction services.

(b) Neither the Government's review, approval or acceptance of, nor payment for, the services required under this contract shall be construed to operate as a waiver of any rights under this contract or any cause of action arising out of the performance of this contract, and the Contractor shall be and remain liable to the Government in accordance with applicable law for all damages to the Government caused by the Contractor's negligent performance of any of the services described in paragraph (a) furnished under this contract.

(c) The rights and remedies of the Government provided under this contract are in addition to any other rights and remedies provided by law.

1.7 NOT USED

1.8 CONTRACT DRAWINGS AND SPECIFICATIONS

1.8.1 SETS FURNISHED

The contractor shall be responsible for making copies of specifications including amendments. Within thirty (30) days after award of the contract, the Government will furnish the Contractor a CD-ROM containing the RFP drawings in an AutoCAD format, RFP technical criteria requirements/specifications in a Specsintact format and other miscellaneous items (amendments and attachments). For additional information, See Section 01332, SUBMITTAL DURING DESIGN. See Section 01040 As-Built Drawings for additional guidance.

1.8.2 NOTIFICATION OF DISCREPANCIES

The Contractor shall check all drawings furnished him immediately upon their receipt and shall promptly notify the Contracting Officer of any discrepancies. Dimensions marked on drawings shall be followed in lieu of scale measurements. Enlarged plans and details shall govern where the same work is shown at smaller scales. All scales shown are based on a standard drawing size of metric drawing size of 841mm x 594mm. If any other size drawings are furnished or plotted the contractor shall adjust the scales accordingly. The contractor shall also advise his sub-contractors of the above. The Contractor shall compare all drawings and verify the figures before laying out the work and will be responsible for any errors which might have been avoided thereby.

1.8.3 OMISSIONS

Omissions from the drawings or specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work but they shall be performed as if fully and correctly

set forth and described in the drawings and specifications.

1.9 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Equipment Room Drawings; G-RE.

This submittal is not required during construction, if equipment room drawings are shown on the 100 percent design submittal.

1.10 PHYSICAL DATA (APR 1984)

Data and information furnished or referred to below is for the Contractors' information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

a. The indications of physical conditions on the drawings and in the specifications are the result of site investigations by surveys auger borings. The data shown graphically and by symbol for each respective boring represents the actual geologic features observed and logged at the location given on the drawings. While the borings are representative of subsurface conditions at their respective locations and for their respective vertical reaches, local minor variations characteristic of the subsurface materials of this region could occur.

b. Weather conditions shall have been investigated by the Contractor to satisfy himself as to the hazards likely to arise therefrom. Complete weather records and reports may be obtained from the local U.S. Weather Bureau.

c. Transportation facilities shall have been investigated by the Contractor to satisfy himself as to the existence of access highways and railroad facilities. (FAR 52.236-4)

1.11 NOT USED

1.12 TELEPHONE SERVICE

Telephone service for Contractor facilities at Schriever AFB will be furnished to the Contractor at no cost except that all long distance calls shall be placed with the Contractor's credit card.

1.13 PAYMENT

1.13.1 PROMPT PAYMENT ACT

Pay requests authorized in CONTRACT CLAUSES clause: "Payments Under Fixed-Price Construction Contracts", will be paid pursuant to the clause,

"Prompt Payment for Construction Contracts". Pay requests will be submitted on ENG Form 93 and 93a, "Payment Estimate-Contract Performance" and "Continuation". All information and substantiation required by the identified contract clauses will be submitted with the ENG Form 93, and the required certification will be included on the last page of the ENG Form 93a, signed by an authorized contractor official and dated when signed. The designated billing office is the Office of the Area Engineer or the Project Manager.

1.13.2 PAYMENTS FOR MODIFICATIONS

Payments may be made for cost bearing change orders within the scope of the contract only to the extent funds are authorized in the order on a two-part modification. Contractor pricing proposed must be submitted at the earliest possible time after the change order is issued, or at a specific time as directed by the Contracting Officer. At the discretion of the Contracting Officer, any and all payments may be withheld on the modification until the Contractor has submitted a qualifying price proposal, in as much detail as required by the Contracting Officer, and the final price has been agreed.

1.13.3 PAYMENT FOR MATERIALS DELIVERED OFFSITE (MAR 1995)

a. Pursuant to FAR clause 52.232-5, Payments Under Fixed Priced Construction Contracts, materials delivered to the contractor at locations other than the site of the work may be taken into consideration in making payments if included in payment estimates and if all the conditions of the General Provisions are fulfilled. Payment for items delivered to locations other than the work site will be limited to: (1) materials required by the technical provisions; or (2) materials that have been fabricated to the point where they are identifiable to an item of work required under this contract.

b. Such payment will be made only after receipt of paid or receipted invoices or invoices with canceled check showing title to the items in the prime contractor and including the value of material and labor incorporated into the item. Payment for materials delivered off-site includes petroleum products. (List additional items for which payments will be made for off-site delivery.) (EFAR 52.232-5000)

1.14 AVAILABILITY OF UTILITY SERVICES

All reasonably required amounts of domestic water and electricity will be made available to the Contractor by the Government from existing system outlets and supplies. The Contractor shall, at his own expense, make all temporary connections and install distribution lines. The Contractor shall furnish to the Contracting Officer a complete system layout drawing showing type of materials to be used and method of installation for all temporary electrical systems. The Contractor shall make arrangements with the Using Service, through the Contracting Officer, as to the method of determining the amount of water and electricity to be used by him and the method of payment therefor. . All temporary lines shall be maintained by the Contractor in a workmanlike manner satisfactory to the Contracting Officer and shall be removed by the Contractor in like manner prior to final acceptance of the construction. Normal quantities of electricity and water used to make final tests of completely installed systems will be furnished by the Government.]

1.15 UTILITY SERVICE INTERRUPTIONS

The Contractor shall submit written notification not less than 15 calendar days in advance of each interruption of each utility and communication service to or within existing buildings and facilities being used by others. No single outage will exceed 4 hours unless approved in writing. The time and duration of all outages will be coordinated and approved with the Using Agency by the Contracting Officer.

1.16 DIGGING PERMITS AND ROAD CLOSINGS

The Contractor shall allow 14 calendar days from date of written application to receive permission to dig and to close roads. Roads shall only be closed one lane at a time and vehicular traffic shall be allowed to pass through the construction area. Work on or near roadways shall be flagged in accordance with the safety requirements in Safety and Health Requirements Manual EM 385-1-1, which forms a part of these specifications. Work located along the alert force route shall not cause blockage and the Contractor shall maintain unobstructed access for alert force traffic at all times.

1.17 VARIATIONS IN ESTIMATED QUANTITIES - SUBDIVIDED ITEMS (MAR 1995)

a. This Variation in Estimated Quantities Clause is applicable only to Items Nos. ____.

(1) Variation from the estimated quantity in the actual work performed under any second or subsequent sub-item or elimination of all work under such a second or subsequent sub-item will not be the basis for an adjustment in contract unit price.

(2) Where the actual quantity of work performed for Items Nos. ____ is less than 85 percent of the quantity of the first sub-item listed under such item, the Contractor will be paid at the contract unit price for that sub-item for the actual quantity of work performed and, in addition, an equitable adjustment shall be made in accordance with the clause FAR 52.211-18, Variation in Estimated Quantity.

(3) If the actual quantity of work performed under Items Nos. ____ exceeds 115% or is less than 85% of the total estimated quantity of the sub-items under that item and/or if the quantity of work performed under the second sub-item or any subsequent sub-item under Items Nos. ____ exceeds 115% or is less than 85% of the estimated quantity of any such sub-item, and if such variation causes an increase or a decrease in the time required for performance of this contract the contract completion time will be adjusted in accordance with the clause. FAR 52.211-18, Variation in Estimated Quantity. (EFARS 52.212-5001)]

1.18 EVALUATION OF SUBDIVIDED ITEMS (MAR 1995)

Items Nos. ____ are subdivided into two or more estimated quantities and are to be separately priced. The Government will evaluate each of these items on the basis of total price of its sub-items. (EFARS 52.212-5000)

1.19 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

a. This clause specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the contract clause entitled "Default: (Fixed-Price Construction)." In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

(1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

(2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the contractor.

b. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY
WORK DAYS BASED ON (5) DAY WORK WEEK

Jan (08)	Feb (05)	Mar (04)	Apr (04)	May (06)	Jun (04)
Jul (07)	Aug (05)	Sep (03)	Oct (02)	Nov (03)	Dec (06)

c. Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph b. above, the contracting officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the contract clause entitled "Default (Fixed Price Construction)". (ER 415-1-15)

1.20 INSURANCE REQUIRED

In accordance with CONTRACT CLAUSES clause: "Insurance Work on a Government Installation," the Contractor shall procure the following minimum insurance:

Type	Amount
Workmen's Compensation and Employer's Liability Insurance	\$100,000
General Liability Insurance	\$500,000 per occurrence

Automobile Liability Insurance	
Bodily injury	\$200,000 per person and \$500,000 per occurrence
Property damage	\$ 20,000 per occurrence

(Coverages per FAR 28.307-2)

1.21 SECURITY REQUIREMENTS

The Contractor shall be responsible for furnishing to each employee and for requiring each employee engaged on the work to display such identification as may be approved and directed by the Contracting Officer. All prescribed identification shall immediately be delivered to the Contracting Officer, for cancellation upon release of any employees. When the contract involves work in restricted security areas, only employees who are U.S. citizens will be permitted to enter. Proof of U.S. citizenship is required prior to entry. When required by the Contracting Officer, the Contractor shall obtain and submit fingerprints of all persons employed or to be employed on the project. (Based on FAR 52.204-2)

1.22 CONTRACTOR QUALITY CONTROL (CQC)

See Section 01451A Contractor Quality Control.

1.23 NONDOMESTIC CONSTRUCTION MATERIALS

The List of nondomestic construction materials or their components included in the list set forth in paragraph 25.104 of the Federal Acquisition Regulation does not apply to the requirements of the contract clause entitled "Buy American Act Construction Materials".

1.24 NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE (SEP 1990)

Any contract awarded as a result of this solicitation will be a DO rated order certified for national defense use under the Defense Priorities and Allocations System (DPAS) (15 CFR 700), and the Contractor will be required to follow all of the requirements of this regulation. (FAR 52.211-14)

1.25 DAILY WORK SCHEDULES

In order to closely coordinate work under this contract, the Contractor shall prepare a written agenda/meeting minutes and attend a weekly coordination meeting with the Contracting Officer and Using Service at which time the Contractor shall submit for coordination and approval, his proposed daily work schedule for the next two week period. The Contractor shall provide a copy of modifications (MODs), Serial Letters, Requests for Information (RFIs) and any other information that is needed in the minutes of the meeting. Required temporary utility services, time and duration of interruptions, and protection of adjoining areas shall be included with the Contractor's proposed 2-week work schedule. At this meeting, the Contractor shall also submit his schedule of proposed dates and times of all preparatory inspections to be performed during the next 2 weeks. The items of work listed on the proposed 2-week schedule are to be keyed to the NAS by activity number and description for each activity anticipated to be performed during the next 2-week period. Coordination action by the Contracting Officer relative to these schedules will be accomplished during these weekly meetings. Daily reports shall be completed and given to the Contracting Officer or Representative within 24 hours of work

1.26 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAR 1995)

a. This statement shall become operative only for negotiated contracts where cost or pricing data is requested, and for modifications to sealed bid or negotiated contracts where cost or pricing data is requested. This clause does not apply to terminations. See 52.249-5000, Basis for settlement of proposals and FAR Part 49.

b. Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a Contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the Contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series of equipment from the Contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, "Construction Equipment Ownership and Operating Expense

Schedule," Region V. Copies of each regional schedule may be obtained through the following internet site:

<http://www.usace.army.mil/inet/usace-docs/eng-pamphlets/ep.htm>. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the Contracting Officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be developed using the formula provided in the schedule. For forward pricing, the Schedule in effect at the time of negotiations shall apply. For retrospective pricing, the Schedule in effect at the time the work was performed shall apply.

c. Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-leaseback arrangements will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees.

c. When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the contracting officer shall request the contractor to submit either certified cost or pricing data, or partial/limited data as appropriate. The data shall be submitted on Standard Form 1411, Contract Pricing Proposal Cover Sheet. (EFARS 52.231-5000)

1.27 AS-BUILT DRAWINGS

See SECTION 01040 - AS-BUILT DRAWINGS

1.28 NOT USED

1.29 NOT USED

1.30 EQUIPMENT ROOM DRAWINGS

Prior to construction, the Contractor shall prepare and submit room plans (see paragraph SUBMITTALS for conditions regarding this submittal under Design/Build procurement) for all mechanical, electrical, and communication rooms or similar areas. The plans shall be consolidated for all trades, shall be to scale, and shall show all pertinent structural features. All equipment shall be accessible and laid out in a good design and workmanship manner and layouts for communications rooms shall be completed as early as possible. In addition, other items such as doors, windows, and cabinets required for installation and which will affect the available space, will be shown. All mechanical and electrical equipment and accessories shall be shown to scale in plan and elevation and/or section in their installed positions. All duct work and piping shall be shown.

1.31 CONTRACTOR FURNISHED EQUIPMENT DATA

See Section 01200 Warranty of Construction for Contractor Furnished Equipment Data to be submitted as part of the Warranty Equipment Booklet.

1.32 NOT USED

1.33 NOT USED

1.34 NOT USED

1.35 NOT USED

1.36 PERFORMANCE OF WORK BY CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least twenty (20) percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government. (FAR 52.236-1)

1.37 NOT USED

1.38 PARTNERING

a. The Government intends to encourage the formation of a cohesive partnership with the Contractor. This partnership will be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The objective is effective contract performance in achieving completion within budget, on schedule and in accordance with plans and specifications. This partnership between the Contractor and the Government will be voluntary and its implementation will not be part of the contract requirements nor will it result in a change to contract price or terms.

b. It is anticipated that immediately after the preconstruction conference, the appropriate Contractor's key personnel and Government key personnel will attend a 1-day team building workshop. Follow-up workshops of 1 or 2 days duration may be held periodically throughout the duration of the contract as agreed to by the Contractor and the Government. Costs of the facilitator and facilities for the workshops will be shared equally by the participants.

1.39 PROFIT

a. Weighted guidelines method of determining profit shall be used on any equitable adjustment change order or modification issued under this contract. The profit factors shall be as follows:

Factor	Rate	Weight	Value
Degree of Risk	20	See Item	
Relative difficulty of work	15	b. below	
Size of Job	15		
Period of performance	15		
Contractor's investment	5		
Assistance by Government	5		
Subcontracting	25		
	100		

b. Based on the circumstances of each procurement action, each of the above factors shall be weighted from .03 to .12 as indicated below. The value shall be obtained by multiplying the rate by the weight. The value column when totalled indicates the fair and reasonable profit percentage under the circumstances of the particular procurement.

(1) Degree of Risk. Where the work involves no risk or the degree of risk is very small, the weighting should be .03; as the degree of risk increases, the weighting should be increased up to a maximum of .12. Lump sum items will have, generally, a higher weighted value than the unit price items for which quantities are provided. Other things to consider: the portion of the work to be done by subcontractors, nature of work, where work is to be performed, reasonableness of negotiated costs, amount of labor included in costs, and whether the negotiation is before or after performance of work.

(2) Relative Difficulty of Work. If the work is most difficult and complex, the weighting should be .12 and should be proportionately reduced to .03 on the simplest of jobs. This factor is tied in to some extent with the degree of risk. Some things to consider: the nature of the work, by whom it is to be done, where, and what is the time schedule.

(3) Size of Job. All work not in excess of \$100,000 shall be weighted at .12. Work estimated between \$100,000 and \$5,000,000 shall be proportionately weighted from .12 to .05.

(4) Periods of Performance. Jobs in excess of 24 months are to be weighted at .12. Jobs of lesser duration are to be proportionately

weighted to a minimum of .03 for jobs not to exceed 30 days. No weight where additional time not required.

(5) Contractor's Investment. To be weighted from .03 to .12 on the basis of below average, average, and above average. Things to consider: amount of subcontracting, mobilization payment item, Government furnished property, equipment and facilities, and expediting assistance.

(6) Assistance by Government. To be weighted from .12 to .03 on the basis of average to above average. Things to consider: use of Government-owned property, equipment and facilities, and expediting assistance.

(7) Subcontracting. To be weighted inversely proportional to the amount of subcontracting. Where 80 percent or more of the work is to be subcontracted, the weighting is to be .03 and such weighting proportionately increased to .12 where all the work is performed by the Contractor's own forces.

1.40 NOT USED

1.41 NOT USED

1.42 LABOR CONDITIONS APPLICABLE TO TEMPORARY FACILITIES

It is the position of the Department of Defense that the Davis-Bacon Act, 40 U.S.C. 276a is applicable to temporary facilities such as batch plants, sandpits, rock quarries, and similar operations, located off the immediate site of the construction but set up exclusively to furnish required materials for a construction project on the site of the work. Clause "Payrolls and Basic Records" of the CONTRACT CLAUSES is applicable to such operations.

1.43 DRAWING SCALES

All scales shown on the RFP project drawings are based on a standard metric drawing size of 841mm x 594mm. If any other size drawings are furnished or plotted, the contractor shall adjust the scales accordingly. The Contractor shall also advise his sub-contractors of the above.

1.44 WAGE RATE APPLICATION

For copies of Wage Rates, See GENERAL WAGE DECISIONS attached at the end of this section.

1.44.1 Building Schedule

Applicable to all work required within 5 feet outside the building lines.

1.44.2 Heavy Schedule

Applicable to all work required beyond 5 feet outside the building.

1.44.3 Highway Schedule

Applicable to all work required beyond 5 feet outside the building.

1.45 (FAR 52.222-23) NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for Minority Participation for Each Trade	Goals for Female Participation for Each Trade
*****	*****
10.9	6.9

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs Office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the -

- (1) Name, address, and telephone number of the subcontractor;
- (2) Employer identification number of the subcontractor;
- (3) Estimated dollar amount of the subcontract;

- (4) Estimated starting and completion dates of the subcontract; and
- (5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is Colorado Springs SMSA-1720, which El Paso County is a part of.

1.46 FEDERAL HOLIDAYS

The following Federal legal holidays are observed by this installation:

New Year's Day	1 January
Martin Luther King's Birthday	Third Monday in January
President's Day	Third Monday in February
Memorial Day	Last Monday in May
Independence Day	4 July
Labor Day	First Monday in September
Columbus Day	Second Monday in October
Veterans Day	11 November
Thanksgiving Day	Fourth Thursday in November
Christmas Day	25 December

If a wage determination applies the number of holidays specified on it, it has priority over this clause.

1.47 BASE HOURS

Base operation hours are 7:00 a.m. to 4:00 p.m. daily (Monday through Friday), excluding federal holidays. Access to the base during other times must be requested in writing from the Contracting Officer and will be granted only for extenuating circumstances.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

General Decision Number CO020006

General Decision Number CO020006
Superseded General Decision No. CO010006
State: Colorado
Construction Type:
BUILDING
County(ies):
EL PASO
BUILDING CONSTRUCTION PROJECTS (does not include residential
construction consisting of single family homes and apartments up
to and including 4 stories).
Modification Number Publication Date
 0 03/01/2002
 1 03/08/2002
 2 04/05/2002
 3 05/03/2002
 4 06/21/2002
 5 07/05/2002

COUNTY(ies):

EL PASO

BRCO0007B 05/01/2002

	Rates	Fringes
BRICKLAYERS	21.92	5.95

CARP0001E 05/01/2002

	Rates	Fringes
CARPENTERS: All Other Work (Including Formbuilding/Formsetting)	20.70	6.10

ELEC0113B 06/01/2002

	Rates	Fringes
ELECTRICIANS (Including Low Voltage Wiring and Installation of Fire Alarms, Computers, Telephones and Temperature Controls)	24.10	3%+9.69

* ELEV0025B 07/01/2002

	Rates	Fringes
ELEVATOR CONSTRUCTORS	25.755	7.455+a

FOOTNOTE:

a. Employer contributes 8% of basic hourly rate for over 5 years' service and 6% basic hourly rate for 6 months' to 5 years' service as Vacation Pay Credit.
SEVEN PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Friday after Thanksgiving Day; and Christmas Day.

ENGI0009E 05/01/2002

	Rates	Fringes
POWER EQUIPMENT OPERATORS:		
Backhoe, under 3/4 yd.	19.92	5.47
Backhoe, 3/4 yd. and over	20.07	5.47
Cranes		
50 tons and under	20.07	5.47
51 to 90 tons	20.22	5.47
91 to 140 tons	20.37	5.47
141 tons and over	21.13	5.47
Front End Loader:		
up to and including 6 cy	19.92	5.47
over 6 cubic yards	20.07	5.47
Belt & Elevating	20.37	5.47
Roller:		
self-propelled, rubber tires		
under 5 tons	19.57	5.47
self-propelled, all types		
over 5 tons	19.92	5.47
Scraper:		
single bowl under 40 cubic yards	20.07	5.47
single bowl including pups		
40 cubic yards and over and tandem bowls	20.22	5.47

Water Wagon	20.07	5.47
Trackhoe	20.07	5.47

IRON0024E 11/01/2001		
	Rates	Fringes
IRONWORKERS, Structural and Reinforcing	21.00	5.45

LABO0720B 05/01/2002		
	Rates	Fringes
LABORERS: Common and Concrete/Mason Tenders	13.50	4.23

PAIN0930A 07/01/2001		
	Rates	Fringes
GLAZIERS	24.79	4.75

PLAS0577C 05/01/2002		
	Rates	Fringes
CEMENT MASONS/ CONCRETE FINISHERS	21.90	5.12

* PLUM0058A 07/01/2002		
	Rates	Fringes
PIPEFITTERS (Including HVAC pipe)& PLUMBERS (Excluding HVAC work):	24.95	7.40

ROOF0058A 05/01/2001		
	Rates	Fringes
ROOFERS	15.25	3.13

* SHEE0009A 07/01/2002		
	Rates	Fringes
SHEET METAL WORKERS (Includes HVAC duct and installation of HVAC systems)	27.27	8.97

SUCO1014A 12/20/2001		
	Rates	Fringes
CARPENTERS: Acoustical	15.02	.76
Drywall Framing/Hanging and Metal Stud Work	15.16	2.33
DRYWALL FINISHERS/TAPERS	14.42	.62
MECHANICAL INSULATORS/ ASBESTOS WORKERS (Including application of all insulating materials, protective coverings, coatings and finishings to all types of mechanical systems)	13.88	
PAINTERS: Brush, Roller & Spray	11.29	3.11

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.		
=====		

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

General Decision Number CO020012

General Decision Number CO020012
Superseded General Decision No. CO010012
State: Colorado
Construction Type:
HEAVY
County(ies):
ADAMS DOUGLAS MESA
ARAPAHOE EL PASO PUEBLO
BOULDER JEFFERSON WELD
DENVER LARIMER
HEAVY CONSTRUCTION PROJECTS
Modification Number Publication Date
0 03/01/2002
1 03/08/2002
2 04/05/2002
3 05/03/2002
4 06/21/2002
5 07/05/2002

COUNTY(ies):

ADAMS	DOUGLAS	MESA
ARAPAHOE	EL PASO	PUEBLO
BOULDER	JEFFERSON	WELD
DENVER	LARIMER	

ASBE0028A 01/01/2001

Rates

Fringes

ASBESTOS WORKERS/INSULATORS

(Includes application of all
insulating materials, protective
coverings, coatings and finishings
to all types of mechanical systems)

17.12

4.85

BRCO0007F 01/01/2002

Rates

Fringes

ADAMS, ARAPAHOE, BOULDER, DENVER, DOUGLAS, AND JEFFERSON
COUNTIES

BRICKLAYERS

21.27

6.60

BRCO0007G 05/01/2002

Rates

Fringes

EL PASO AND PUEBLO COUNTIES

BRICKLAYERS

21.92

5.95

CARP2834A 05/01/2001

Rates

Fringes

MILLWRIGHTS

22.22

5.84

* ELEC0012D 06/01/2002

Rates

Fringes

PUEBLO COUNTY

ELECTRICIANS:

Electrical work where the total
cost is \$200,000 or less

18.98

7.44

Electrical work where the total
cost is over \$200,000

22.74

7.44

ELEC0068A 06/01/2001

Rates

Fringes

ADAMS, ARAPAHOE, BOULDER, DENVER, DOUGLAS, JEFFERSON, LARIMER,
AND WELD COUNTIES

ELECTRICIANS

25.76

3%+7.21

ELEC0111A 09/01/2001

Rates

Fringes

LINE CONSTRUCTION:

Lineman

26.56

19.75%+2.20

Groundman

13.64

19.75%+2.20

ELEC0113C 06/01/2002

Rates

Fringes

EL PASO COUNTY

ELECTRICIANS

24.10

3%+9.69

ELEC0969B 06/01/2000

Rates

Fringes

MESA COUNTY
ELECTRICIANS

20.35

4%+5.14

ENGI0009A 05/01/2002

Rates

Fringes

POWER EQUIPMENT OPERATORS:

Blade:

Rough

19.92

5.47

Finish

20.22

5.47

Bulldozer

19.92

5.47

Cranes:

50 tons and under

20.07

5.47

51 to 90 tons

20.22

5.47

91 to 140 tons

20.37

5.47

141 tons and over

21.13

5.47

Forklift

19.57

5.47

Mechanic

20.07

5.47

Oiler

19.22

5.47

Roller:

Self-propelled, rubber tires
under 5 tons

19.57

5.47

Self-propelled, all types
over 5 tons

19.92

5.47

Scraper:

Single bowl under 40 cubic
yards

20.07

5.47

Single bowl including pups
40 cubic yards and over and
tandem bowls

20.22

5.47

Trackhoe

20.07

5.47

IRON0024F 11/01/2001

Rates

Fringes

IRONWORKERS:

Structural

21.00

7.36

LABO0086A 05/01/2002

Rates

Fringes

LABORERS:

Pipelayer

15.69

3.95

* PLUM0003E 07/01/2002

Rates

Fringes

ADAMS, ARAPAHOE, BOULDER, DENVER, DOUGLAS (Northern half),
JEFFERSON, LARIMER AND WELD COUNTIES

PLUMBERS

26.52

6.64

PLUM0020B 07/01/2001

Rates

Fringes

PUEBLO COUNTY

PLUMBERS & PIPEFITTERS:

Free Zone - 0 to 40 miles

19.85

6.17

Zone 1 - 40 miles and over: \$19.85 per hour + \$32.00 per day
per diem will be paid on projects over 40 miles (Zone 1)
measured in practical driving miles by the shortest route,
beginning at 5th and Main Streets in Pueblo, Colorado, when
the employee stays overnight or drives their own vehicle.

Hazardous pay: Add \$2.20 per hour to base rate.
Hazardous pay applies to projects at chemical plants,
steel mills, cement plants, power generator plants, process
piping at manufacturing plants, food processing plants, and
all projects which may present a health hazard or serious
personal injury.

* PLUM0058B 07/01/2002		
	Rates	Fringes
EL PASO AND DOUGLAS (Southern half) COUNTIES		
PLUMBERS & PIPEFITTERS	24.95	7.40

PLUM0145B 05/01/2002		
	Rates	Fringes
MESA COUNTY		
PLUMBERS & PIPEFITTERS	22.28	5.60

* PLUM0208J 07/01/2002		
	Rates	Fringes
ADAMS, ARAPAHOE, BOULDER, DENVER, DOUGLAS (Northern half), LARIMER AND WELD COUNTIES		
PIPEFITTERS	26.62	6.54

* SHEE0009B 07/01/2002		
	Rates	Fringes
SHEET METAL WORKERS	27.27	8.97

SUCO1033A 12/20/2001		
	Rates	Fringes
BOILERMAKERS	17.60	
CEMENT MASONS/CONCRETE FINISHERS	17.31	2.85
CARPENTERS:		
Form Building and Setting	16.97	2.74
All Other Work	15.14	3.37
IRONWORKERS, Reinforcing	18.83	3.90
LABORERS:		
Common	11.22	2.92
Landscape	12.56	3.21
Flagger	8.91	3.80
PAINTERS:		
Brush, Roller & Spray	15.81	3.26
POWER EQUIPMENT OPERATORS:		
Backhoe	16.36	2.48
Front End Loader	17.24	3.23
Skid Loader	15.37	4.41

TEAM0435A 05/01/2000		
	Rates	Fringes
TRUCK DRIVERS:		
Pickup	14.21	5.27
Tandem/Semi and Water	14.93	5.27

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.		
=====		
Unlisted classifications needed for work not included within		

the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
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Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

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Administrative Review Board
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

General Decision Number CO020014

General Decision Number CO020014
Superseded General Decision No. CO010014
State: Colorado
Construction Type:
HIGHWAY
County(ies):
ADAMS DOUGLAS MESA
ARAPAHOE EL PASO PUEBLO
BOULDER JEFFERSON WELD
DENVER LARIMER
HIGHWAY CONSTRUCTION PROJECTS
Modification Number Publication Date
0 03/01/2002
1 03/08/2002
2 03/22/2002
3 04/05/2002
4 05/03/2002
5 06/21/2002
6 07/05/2002

COUNTY(ies):

ADAMS	DOUGLAS	MESA
ARAPAHOE	EL PASO	PUEBLO
BOULDER	JEFFERSON	WELD
DENVER	LARIMER	

* ELEC0012F 06/01/2002

	Rates	Fringes
PUEBLO COUNTY		
ELECTRICIANS (Excluding traffic signal installation):		
Electrical work where the total cost is \$200,000 or less	18.98	7.44
Electrical work where the total cost is over \$200,000	22.74	7.44

ELEC0068N 06/01/2001

	Rates	Fringes
ADAMS, ARAPAHOE, BOULDER, DENVER, DOUGLAS, JEFFERSON, LARIMER AND WELD COUNTIES		
ELECTRICIANS (Excluding traffic signal installation)	25.76	3%+7.21

ELEC0113F 06/01/2002

	Rates	Fringes
EL PASO COUNTY		
ELECTRICIANS (Excluding traffic signal installation)	24.10	3%+9.69

ELEC0969F 06/01/2000

	Rates	Fringes
MESA COUNTY		
ELECTRICIANS (Excluding traffic signal installation)	20.35	4%+5.14

ENGI0009B 05/01/2002

	Rates	Fringes
POWER EQUIPMENT OPERATORS:		
Asphalt Screed	19.92	5.47
Asphalt Spreader/ Laydown Machine	19.92	5.47
Bulldozer	19.92	5.47
Compactor:		
Under 5 tons	19.57	5.47
Over 5 tons	19.92	5.47
Crane:		
50 tons and under	20.07	5.47
51 to 90 tons	20.22	5.47
91 to 140 tons	20.37	5.47
141 tons and over	21.13	5.47
Drill Operator:		
William MF/Watson 2500 only	20.22	5.47
Grader/Blade:		
Rough	19.92	5.47
Finish	20.22	5.47
Loader:		
Barber Green, etc. &		

Up to and including 6 cubic yards	19.92	5.47
Over 6 cubic yards	20.07	5.47
Mechanic and/or Welder (Includes heavy duty & combination mechanic and welder):		
Mechanic	20.07	5.47
Mechanic/Welder (heavy duty)	20.22	5.47
Oiler	19.22	5.47
Power Broom:		
Under 70 HP	19.22	5.47
70 HP and over	19.92	5.47
Roller:		
Self-propelled, rubber tires under 5 tons	19.57	5.47
Self-propelled, all types over 5 tons	19.92	5.47
Scraper:		
Single bowl under 40 cubic yards	20.07	5.47
Single bowl including pups 40 cubic yards and tandem bowls and over	20.22	5.47
Trackhoe	20.07	5.47

LABO0086B 05/01/2002

	Rates	Fringes
LABORERS:		
Asphalt Laborer/Raker, Common Laborer & Concrete Laborer/Mason Tender	15.69	3.95

SUCO1002A 12/20/2001

	Rates	Fringes
BRICKLAYERS	15.55	2.85
CARPENTERS:		
Form Work (Excluding Curbs & Gutters)	16.54	3.90
All Other Work	16.61	3.88
CONCRETE FINISHERS/		
CEMENT MASONS	16.05	3.00
GROUND MEN	11.44	3.25
IRONWORKERS:		
Reinforcing	16.69	5.45
Bridge Rail (Excludes Guardrail)	18.22	6.01
LABORERS:		
Dumpman	13.00	2.07
Fence Erector (Includes fencing on bridges)	13.02	3.20
Form Work (Curbs & Gutters only)	11.85	3.45
Guardrail Erector (Excludes bridgerail)	12.89	3.20
Landscape and Irrigation Laborer	12.26	3.16

Pipelayer	13.55	2.41
Striping Laborer (Pre-form layout and removal of pavement markings)	12.62	3.21
Traffic Director/Flagger	9.55	3.05
Traffic and Sign Laborer (Sets up barricades and cones, and installs permanent signs)	12.43	3.22
PAINTERS:		
Brush	16.94	2.10
Spray	16.99	2.87
POWER EQUIPMENT OPERATORS:		
Backhoes	16.54	4.24
Bobcat/Skid Loader	15.37	4.28
Concrete Pump Operator	16.52	4.30
Drill Operator:		
All except William MF/ Watson 2500	16.74	2.66
Forklift	15.91	4.09
Rotomill Operator	16.22	4.41
Post Driver/Punch Machine	16.07	4.41
Tractor	13.13	2.95
TRAFFIC SIGNAL INSTALLERS	18.66	4.12
TRUCK DRIVERS:		
Floats-Semi Truck	14.86	3.08
Multipurpose Truck/Hoist	14.35	3.49
Truck Mechanic	16.91	3.01
Pickup Truck	13.41	3.80
Pilot/Sign/Barricade Truck (Pilot truck and transports signs, cones and barricades)	14.15	3.63
Single Axle Truck	14.24	3.77

TEAM0435B 05/01/2000

	Rates	Fringes
TRUCK DRIVERS:		
Distributor Truck	15.80	5.27
Dump Truck:		
To and including 6 cubic yards & over 6 cubic yards		
to and including 14 cubic yards	14.93	5.27
Over 14 cubic yards to and including 29 cubic yards	15.27	5.27
Over 29 cubic yards to and including 79 cubic yards	15.80	5.27
Over 79 cubic yards	16.45	5.27
High/Low Boy Truck	17.25	5.27
Tandem Axle/Flat Rack Truck	14.21	5.27
Water Wagon	14.93	5.27

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

=====

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

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WAGE DETERMINATION APPEALS PROCESS

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U.S. Department of Labor
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Washington, D. C. 20210

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Administrative Review Board
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

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A B C D E F G H I
J K L M N O P Q R
S T U V W X Y Z
a b c d e f g h i j k l m
n o p q r s t u v w x y z
1 2 3 4 5 6 7 8 9 10

A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m
n o p q r s t u v w x y z
1 2 3 4 5 6 7 8 9 10

Note: Above lettering styles are Helios Extra Bold Condensed and Helios Bold II.
Helvetica Black Roman and Helvetica Bold Roman are acceptable substitutes.

STANDARD
ALPHABET & NUMERALS
OFFICE OF THE DISTRICT ENGINEER
OMAHA, NEBRASKA
REV. NOVEMBER, 1982

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NOTES:

1. Posts to be S4S.
2. Plywood shall be exterior type. A-C grade.
3. Before painting, surface to be clean, dry, free from grease and sanded.
4. Paint with one exterior oil prime coat and exterior type alkyd, conforming to Master Painters Institute MPI-9, MPI Gloss level 6. Color shall match Sherwin Williams SW 2175.
5. All lettering to be exterior type alkyd.
6. Color shall match Sherwin Williams SW 1900.
7. Decalcomania for Corps of Engineers Insignia and U.S. Air Force Emblem will be furnished by the Contracting Officer for installation by the Contractor.

All exposed wood (posts, supports, back, etc.) shall be painted the same background color as the sign.



U.S. AIR FORCE

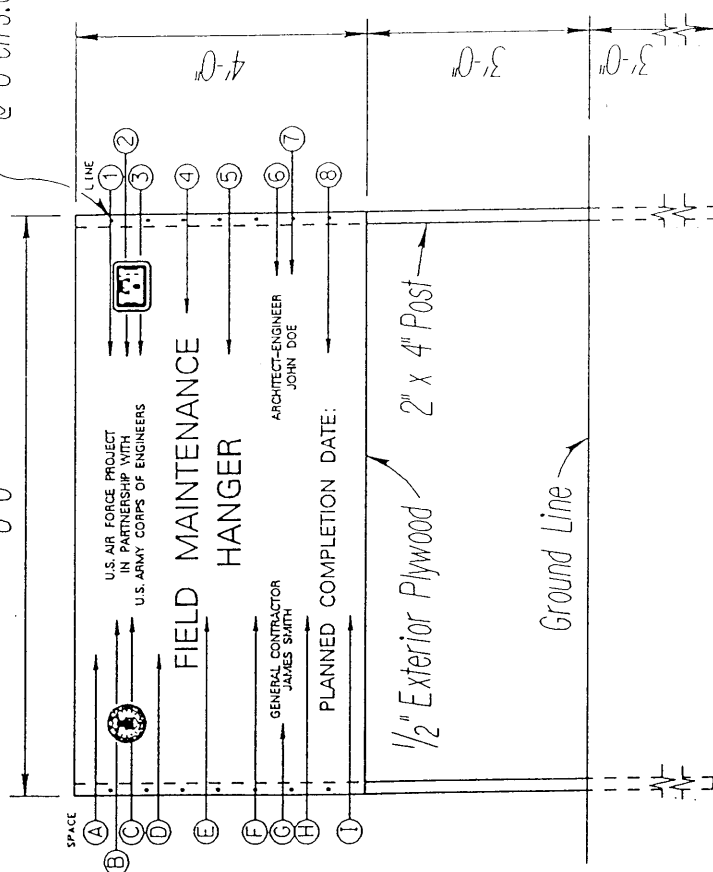
AIR FORCE EMBLEM
(NOT TO SCALE)

SCHEDULE

SPACE	HEIGHT	LINE	DESCRIPTION	LETTER HEIGHT	STROKE
A	5"	1	U.S. AIR FORCE PROJECT	1.5"	$\frac{3}{16}$ "
B	1"	2	IN PARTNERSHIP WITH	1.5"	$\frac{3}{16}$ "
C	1"	3	U.S. ARMY CORPS OF ENGINEERS	1.5"	$\frac{3}{16}$ "
D	5"	4	PROJECT NAME	4"	$\frac{1}{2}$ "
E	3"	5	PROJECT NAME CONT'D (IF REQ.)	4"	$\frac{1}{2}$ "
F	5"	6	GENERAL CONTRACTOR/A-E	1.5"	$\frac{3}{16}$ "
G	1"	7	GENERAL CONTRACTOR/A-E	1.5"	$\frac{3}{16}$ "
H	4"	8	PLANNED COMPLETION DATE	2.5"	$\frac{1}{4}$ "
I	5"				

*Nail with 8d galv. nails
@ 6" ctrs. each post*

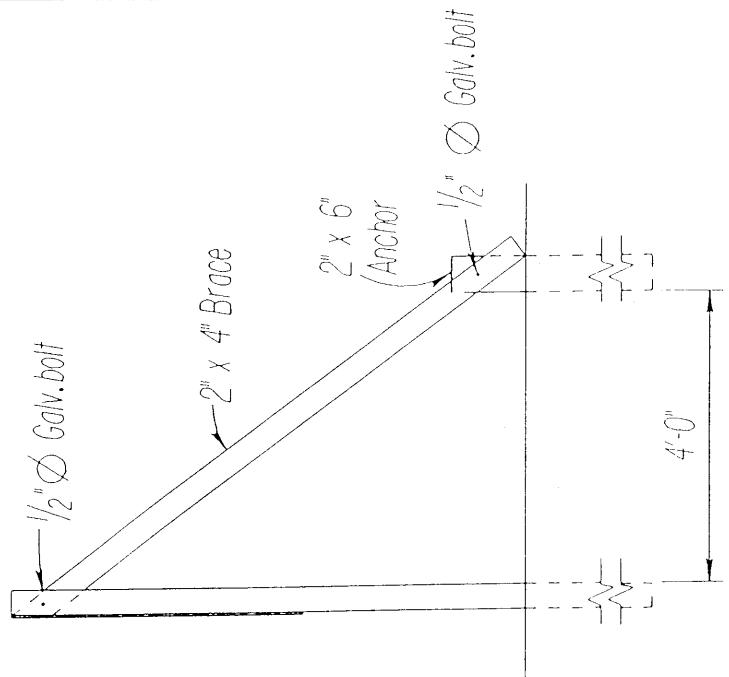
8'-0"



STANDARD

PROJECT SIGN
U.S. AIR FORCE MCP PROJECTS

OFFICE OF THE DISTRICT ENGINEER
OMAHA, NE
REV. OCTOBER 1993



FRONT VIEW

END VIEW

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SECTION 01001

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SECTION 01001

SUMMARY OF WORK

1. PART 1 SUMMARY OF WORK

1.1. GENERAL

The Contractor shall design and construct the FY-02 Medical/Dental Clinic at Schriever AFB, Colorado to result in a complete and usable facility based on Design and Construction Requirements contained within this solicitation.

The Contractor shall design and construct the Clinic in accordance with concept floor plans, elevations and other drawings and requirements provided within this solicitation. The maximum total floor area shall be as dimensioned on the concept floor plans included in this solicitation. All related sitework shall be provided. The Contractor shall design and construct the parking areas, sidewalks, landscaping, and utilities, in accordance with the preliminary design documents provided herein.

The design of the Clinic Addition is to be compatible with the existing Operational Support Facility (OSF) located to the east of the new Clinic facility in terms of massing, scale, color, pattern, texture, and detailing. Site planning and architectural planning are strongly interdependent. The materials and methods of construction have been selected for maximum durability and ease of maintenance, and for conformance to the architectural compatibility guide of the base comprehensive plan.

1.2. DESIGN CRITERIA

In addition to criteria indicated elsewhere in this RFP document, refer to Appendices for additional design requirements and guidance.

1.3. DESIGN REQUIREMENTS

1.3.1. GENERAL

The Contractor shall prepare complete construction documents for all work designed as required by the RFP. The construction documents to be prepared include, but are not limited to construction drawings, specifications, submittals, and design analysis as defined elsewhere in this RFP. Materials and equipment shall be limited to those specified except that where no specific material and equipment is specified or where no basis of design is identified, the Contractor shall use materials and equipment accepted within the construction industry consistent with the design criteria and requirements contained herein.

The project shall be designed in accordance with the RFP using industry standard materials and efficient practices except as otherwise specifically indicated. The Contractor shall be responsible for the professional quality, code compliance, technical accuracy and coordination of all designs, drawings, specifications and other documents or publications upon which the design and construction are based.

1.4. CRITERIA INTENT

The intent of this criteria section is to describe the requirements for appearance, function, and equipment, materials, and types of construction in sufficient detail to enable engineering and design to be completed by the Contractor. In this criteria section, each discipline describes design intent and outlines the parameters to which the Contractor shall design.

1.5. COORDINATION BETWEEN THE VARIOUS DISCIPLINES

The Contractor shall be responsible for the coordination between disciplines in order to fulfill the requirements of this contract and to provide for a complete, integrated and functional design.

1.6. QUALITY OF WORK

Construction documents shall be sufficient to afford a clear understanding of the construction work required. The work shall be organized in a manner that will assure thorough coordination between the various details on the drawings, and between the drawings and the specifications. The Contractor shall cross-check all work until all conflicts have been reconciled.

1.7. RFP DESIGN AND TECHNICAL CRITERIA

All designs and construction document drawings and specifications shall be prepared to comply with the RFP. The RFP describes the design work that shall not be changed, and shall be included in the construction documents. All remaining design work shall be performed by the Contractor based on the design criteria as required by the RFP. No deviations from the criteria will be allowed unless prior approval is obtained from the Contracting Officer's Representative. All questions or problems encountered by the Contractor in the following criteria shall be promptly submitted in writing with recommendations to the Contracting Officer's Representative for approval.

Sections 01001-01008 of this RFP define the design and performance criteria along with information contained within the Attachments of this RFP and DOD Mil Handbook 1191 and DOD Mil Std 1691 (both on the advertised CD-ROM under the "Specs" toolbar. The applicable building codes and standards shall be used as the minimum criteria to develop the construction documents for areas of work not specifically defined. Also, format and procedural requirements are contained within Division 01 sections.

Specification use and guidance is provided in Section 01332 SUBMITTALS DURING DESIGN. The Contractor's Designer of Record shall develop technical specifications for all areas of work (See Sections 01336 and 01338 for 60% and 100% submittal requirements.

1.8. CONFLICTS IN RFP CRITERIA

Where the various elements of the RFP are in conflict, the following priority shall be used to establish precedence, unless specifically noted otherwise:

- a. The most stringent requirement shall be assumed as the design requirement in case of conflicting requirements.

1.9. APPLICABLE BUILDING CODES AND STANDARDS

The following codes of the most current edition shall be used as standards for building construction and life safety design. Where there is a conflict between the RFP and building codes, the most stringent shall apply. When codes are in conflict, the most stringent shall apply. This list is not intended to be a complete list. All work shall be designed and constructed to meet all state and federal codes, standards and laws. Refer to the technical specifications for other standards and references not listed below.

UBC	Uniform Building Code, current edition
UMC	Uniform Mechanical Code, current edition
NEC	National Electrical Code, current edition
NFPA	National Fire Protection Association Codes and Standards, current editions
NAPHCC	National Standard Plumbing Code, current edition
BCCI	Standard Plumbing Code, current edition
ANSI	American National Standards Institute Standards
IES	Illuminating Engineering Society Lighting Handbook
NEMA	National Electrical Manufacturer's Association
NESC	National Electrical Safety Code
UL	Underwriter's Laboratories
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ADAAG	Americans with Disabilities Act Accessibility Guidelines, Current Edition
MIL-HDBK-1008C	US Army Corps of Engineers, Mobile District Design Manual, Current Edition
	Federal Standard 795 (Accessibility)
ASCE 7-95	American Society Of Civil Engineers, Minimum Design Loads For Buildings And Other Structures
AFDS	Air Force Design Guide, current edition
MIL-HDBK-1191	Department of Defense Medical and Dental Facilities, Design and Construction Criteria

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AEI MDS	Architect Engineering Instructions - Medical Design Standards
MIL-STD-1691	Construction and Material Schedule for Military Medical and Dental Facilities
Guide Plates	Air Force Medical Design Guide Plates
ADA	Americans with Disabilities Act
UFAS	Uniform Federal Accessibility Standards
Force Protection	Interim Department of Defense Antiterrorism/Force Protection Construction Standards.

1.10. METRIC DESIGN

The design shall be developed using the Metric system of units.

1.11. GENERAL CONSTRUCTION REQUIREMENTS

1.11.1. EQUIPMENT

Equipment will be the logistical responsibility indicated in MIL-STD-1691. Equipment is required in accordance with design requirements diagrams and AF guide plates.

1.12. STAGING AREA AND HAUL ROUTES

The construction contractor staging areas and haul routes shall be as depicted on the contract drawings.

1.13. BORROW AND SPOIL AREAS

No borrow or spoil areas are available to the Contractor within the confines of Schriever AFB. All fill material will be brought in from offsite and all materials to be disposed of shall be removed entirely from Schriever AFB and disposed of in a legal and regulated manner.

1.14. GEOTECHNICAL INVESTIGATION

Although borings have been made by the Government in the general area, it is the Contractor's responsibility to investigate the subsurface soil conditions, ground water table, and soil resistivity at the site(s). The Contractor shall be responsible for the design of structure foundations, pavement sections, and any other geotechnical considerations, based on his own investigation(s) and evaluation(s) of actual field conditions. The Contractor shall take a minimum of one boring per 750 square meters of building footprint. The borings shall be continuously sampled by a splitspoon sampler or similar technique to the depth of 6 meters or refusal, which ever happens first. Samples shall be classified and logged by a geologist.

DESIGN AND CONSTRUCTION
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1.15. SUSTAINABLE TECHNOLOGY

To the extent referenced in the solicitation, the Contractor shall provide a facility which utilizes sustainable design principles. The basic objectives are to:

- 1) Reduce consumption of energy, land and other non-renewable resources.
- 2) Minimize waste of materials, water, and other limited resources.
- 3) Consider the cost of energy dollars while creating livable, healthy and productive environments that maintain comfort, health, and safety for the people using the facility.

Green Building Technology and Whole Building Design are referenced names involving sustainable design principles.

Related References:

ETL 1110-3-491 (31 January 2000) Sustainable Design for Military Facilities

Web Sites to Consider for Sustainable Design:

EPA Designated Product (available at <http://www.epa.gov/cpg>)
Green Building Council: <http://www.usgbc.org>
Whole Building Design Guide: <http://www.wbdg.org/>
Energy Star Building Program - Environmental Protection Agency:
<http://www.epa.gov/energystar/>
Leadership in Energy and Environmental Design Green Building Rating System Criteria (LEED) U. S. Green Building Council:
<http://www.usgbc.org/programs.leed.htm>
For additional information and referencing of Whole-Building Design strategies, visit the U. S. Department of Energy Website:
www.eren.doe.gov/buildings/build_design.html

1.16. BUILDING SIZE

The Medical/Dental Clinic shall have a gross area of 1,092.66 gross square meters, or less.

1.17. DRAWINGS

Functional RFP drawings of the site area and floor plans are included for use in developing this design.

1.18. OPERATION AND MAINTENANCE REQUIREMENTS/TRAINING

1.18.1. Operation and Maintenance Manuals

The intent of the O&M Manuals are to promote and maximize the efficiency, economy, safety, and effectiveness of the life cycle operation, maintenance,

and repair of the facility. Operation and maintenance manuals as required by the Specification design guidance shall be provided.

1.18.2. Training

The Contractor shall provide operational and maintenance training for all systems furnished under this contract. The training will be for the operating and maintenance personnel. The training shall be put on by the system manufacturer. The training shall not take place until the operation and maintenance manuals are submitted and approved. The Contractor shall video tape all training sessions on VHS tapes and provide tapes to the Government.

1.19. OVERVIEW OF DESIGN-BUILD PROCESS

1.19.1. Overview

Since the early 1980s Congress has urged the military services to explore alternative construction methods, such as "Design-Build," which includes both design and construction under a single contract. This process is similar to "one-step turnkey selection procedures" and is defined in Title 10 of the United States Codes, Section 2862.

1.19.2. Process

The design-build process uses a Request for Proposal (RFP) to solicit for design and construction of a facility by a single contractual entity, such as a design-build firm, or joint venture between architect-engineer (A-E) and construction firm, or a construction management (CM) firm joint venture with an A-E and a construction firm. A design-build RFP states the project functional requirements, design and engineering criteria, technical performance specifications, and proposal evaluation factors. Potential contractors develop their proposals for the government to evaluate competitively, with the contract award based on a combination of technical merit and price.

In general, the RFP is a conceptual design document and the design-build contractor is responsible for completing the design and constructing the project. The RFP has developed the site plan and building design and given the facility an architectural character. These designs, with minor deviations allowed for detailing and constructibility, must be carried through to construction. The design-build contractor is responsible for all other designs on the project, such as the HVAC system, as long as they fit within the established criteria, and can be built on time and within budget.

After award of the contract, the design-build contractor will prepare a series of design submittals for review by the Government, so that design and criteria compliance can be effectively monitored for compliance. After approval of the final design, construction can begin. On-site construction activities shall not begin until all final corrected plans, specifications and design analysis for the project (as defined in Section 00800) have been accepted by the Government (for purposes of beginning construction), and construction documents are received).

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1.20. DESIGN-BUILD CONTRACTOR REQUIRED A/E SERVICES

The following is a condensed summary of Section 01332, "SUBMITTALS DURING DESIGN" contained elsewhere in this document. Refer to this Section for the full requirements.

1.20.1. Dimensions

Design, products (if available in metric) and construction of the Medical/Dental Clinic shall be accomplished using hard metric expressions of measurement (See Section 01415 Metric Measurements). All measurements in the technical performance specifications sections are shown in metric. Soft metric conversions from their English units are permitted for modular construction products, unless the application of the product requires it to coordinate dimensionally into the 100 mm building module. Modular construction products are brick, concrete block, suspended ceiling systems, recessed lighting, and other manufactured components with dimensions based upon a 102 mm building module.

1.20.2. Professional Registration

The award of contract will be made to one qualified contractual entity who will be responsible for design completion and the entire construction process for the facility. This contractual entity shall employ qualified building design professionals with appropriate state registration.

1.20.3. Request For Proposal - Binding Information

The information contained in this Request for Proposal (RFP) shall be considered binding unless specifically waived by the Contracting Officer. The successful offerer's proposal, along with any clarifications and/or best and final offers are a binding part of this contract. Site design, building design, architectural character and engineering/performance criteria shall be implemented through construction by the design-build contractor.

1.20.4. Evaluation of Systems

As part of the basic services, the design-build contractor shall evaluate building systems and components for their possible inclusion into the design. If these systems and components meet the specified design and performance criteria in the RFP, they may then be incorporated into the work.

1.20.5. Document Requirements

(a) Design documents at all stages of design include:

- (1) Construction drawings.
- (2) Specifications.
- (3) Design analysis narrative with calculations for all disciplines.
- (4) Magnetic media at the 100 percent corrected final design only.

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(b) Drawing Requirements

All design drawings shall be accomplished using metric (SI) measurement. Prepare 594 mm x 841 mm full-size drawings and half-size drawings in accordance with the Omaha District CADD Standards Manual (Available at the following Internet address:

ftp://ftp.nwo.usace.army.mil/pub/ED/CADD/ae/standards/
file: ACADstd.pdf for AutoCAD.).

The design-build contractor shall submit the design at various stages of completion, plus the final documents, for review and comment. These stages are:

60 percent design submittal.

100 percent design submittal.

100 percent corrected final design.

(c) 60 Percent Design Requirements

Drawings, specifications, design analysis, color boards and calculations for all disciplines at an approximate 60 percent level of completion.

(d) 100 Percent Design Requirements

Incorporate all comments from the 60 percent review.

Drawings, specifications, design analysis, color board and calculations for all disciplines at 100 percent level of completion. All aspects of the project are complete.

Updated Color boards; SID and CID.

(e) 100 Percent Corrected Final Design

Incorporate comments from the 100 percent design submittal.

Magnetic media.

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1.20.6. Sequence Of Design-Construction

The schedule for design-construction shall meet the requirements as set forth in the provisions of the contract. See Section 00800 SPECIAL CONTRACT REQUIREMENTS for additional requirements.

2. PART 2 NOT USED

3. PART 3 NOT USED

-- End of Section --

SECTION 01002

SITE WORK

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1. PART 1 SITE WORK

1.1. REFERENCES

DEPARTMENT OF THE AIR FORCE

TI 804-01	(1 July 98) Area Planning, Site Planning and Design
TI 814-01	(3 Aug 98) Water Supply
TI 814-10	(3 Aug 98) Wastewater Collection
TM 5-803-5	(Mar 81) Installation Design [Ref: AFM 88-43]
TM 5-820-4	(Oct 83) Drainage Areas Other Than Airfields [Ref: AFM 88-5, Chap. 4]
TM 5-822-5	(June 92) Pavement Design for Roads, Streets Walks, and Open Storage Areas [Ref: AFM 88-7, Chap. 1]
TM 5-813-5	(3 Nov 86) Water Supply, Water Distribution [Ref: AFM 88-10, Vol. 5]
TM 5-813-7	(2 Sep 86) Water Supply for Special Project [Ref: AFM 88-10, Vol 7}}
TM 5-814-1	(4 Mar 85) Sanitary and Industrial Wastewater Collection - Gravity Sewers and Appurtenances [Ref: AFM 88-11, Vol 1]
TM 5-814-2	(15 Mar 85) Sanitary and Industrial Wastewater Collection-- Pumping Stations and Force Mains [Ref: AFM 88-11, Vol 2]

AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM)

ASTM D 977	(1991) Emulsified Asphalt
ASTM D 2027	(1976; R 1992) Cutback Asphalt (Medium-Curing Type)
ASTM D 2028	(1976; R 1992) Cutback Asphalt (Rapid-Curing Type)
ASTM D 2397	(1994) Cationic Emulsified Asphalt

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AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C651	(1992) Disinfecting Water Mains
AWWA M 17	(1989) Installation, Field Testing, and Maintenance of Fire Hydrants

FEDERAL STANDARDS (FED STD)

FED STD 795	(April 1988) Uniform Federal Accessibility Standards
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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

NWS HYDRO-35	(June 1977) Five to 60-Minute Precipitation Frequency For The Eastern and Central United States
NOAA ATLAS 2	(1973) Precipitation-Frequency Atlas of the Western United States

HANDICAPPED STANDARDS (HS)

ADAAG	(January 1998) Accessibility Guidelines for Buildings and Facilities
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AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO	A Policy on Geometric Design of Highways and Streets
AASHTO HB-16	(1996) Standard Specification for Highway Bridges

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

D6.1-1988	Manual on Uniform Traffic Control Devices for Streets & Highways
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MILITARY HANDBOOKS (MH)

MIL-HDBK-1008C	(10 Jun 1997) Fire Protection for Facilities Engineering, Design, and Construction
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NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)Org

NFPA 24	Standard for the Installation of Private Fire Service Mains and Their Appurtenances, 1995 Edition
NFPA 54	National Fuel Gas Code, 1999 Edition

National Institute of Standards and Technology (NIST)

NIST 44 (Current Edition) Weights and Measures
Handbook 44

STATE OF COLORADO SPECIFICATIONS

Colorado Highway Specifications

1.2. OMAHA DISTRICT CORPS OF ENGINEERS STANDARD DETAILS AND CADD CELLS.

The Omaha Districts Civil and Environmental standard details and CADD cells are available on the Omaha District FTP site. These standards and cells are available for the Contractor's use. References to using exact details and drawings are found in this section. In those cases, the Contractor shall use the referenced standard drawings and/or details.

1.3. SURVEY

1.3.1. Field Survey

The engineering survey to be used in the development of the design submittal is available to the Contractor on CD-ROM furnished with this solicitation. The information is in a 3-d AutoCAD Release 14 metric drawing file. The survey data information was gathered by a topographical survey performed in October of 1999. Contours were gathered at .25 m intervals. The survey drawings shall be used by the Contractor to prepare for development of design drawings. Any additional survey information required by the Contractor for preparation of his proposal or for development of design drawings shall be obtained by the Contractor at his own expense. See SECTION 01332 SUBMITTALS DURING DESIGN for additional information on the availability and format of the survey files to be utilized for design.

1.3.2. Survey Monuments

Four permanent survey monuments of second order horizontal and vertical accuracy have been established around the Medical/Dental Clinic site. North of the new Medical/Dental Clinic are two intervisible monuments located in the median of Falcon Parkway. In addition, two monuments are located on the south side of an existing road that borders the south side of the project site. All monuments are indicated on the RFP documents along with their descriptions.

1.4. STAGING AND CONTRACTORS ACCESS

1.4.1. Staging Area

The location of the Contractor staging area shall be as shown on Sheet C-1 of the RFP solicitation package. Staging area shall be returned to its original condition upon completion of construction.

1.4.2. Contractors Access Route

The Contractor's Access Route is as indicated on the RFP solicitation package.

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1.5. DEMOLITION

Disposals required for this project are limited, as the building is being constructed on an undeveloped site.

a. Some removal and replacement or restoration of irrigation lines and sod may be required for the installation of the new utility lines. See Irrigation Sprinkler System paragraph for additional requirements.

b. The Contractor shall remove all pavements, utilities and other appurtenances necessary to construct the new facility. Unless otherwise specified, disposal of all removed materials shall be outside the limits of Government controlled lands in accordance with federal, state, and local regulations. The Contractor shall notify the Contracting Officer if any material to be disposed of is found to contain hazardous, toxic, biological or radiological substances. Rubbish and debris shall be removed from Government property daily to avoid accumulation at the project site. Demolition shall conform to UFGS Section 02220 DEMOLITION.

1.6. NEW CONSTRUCTION

The location and construction of the Medical/Dental Clinic, access drive, parking, utilities and landscaping shall be as indicated on the attached drawings and in these specifications.

1.6.1. Building

Location and construction of the Medical/Dental Clinic, including associated structures, roads, parking, utilities and landscaping shall be as indicated on the attached drawings and as specified herein. The new building shall be fully handicap accessible. Minor changes to the overall layout may be accepted by the Government if it is beneficial to the overall design of the project.

1.6.2. Main Entrance

The entrance walk and parking lot layout shall be as shown on the drawings, though minor alterations may be made as the site design is further developed. The main entrance walk shall be scored concrete.

1.6.3. Walks

Exterior concrete walks shall be placed at the locations indicated on the Site Plan. Walks shall have a medium broom finish. Adjustments to the walk layout may be made to facilitate the final Site Plan. Walks along the parking lots shall be a minimum of 2 m wide. Walks abutting the handicapped parking area shall be a minimum of 2.5 m. Walks leading to all other entrances shall be a minimum of 1.8 m wide.

1.6.4. Parking Areas

Parking areas are indicated on the Site Layout Plan and shall be located a minimum of 24.4 meters from the building main entrance. Provide, as a minimum, the number of parking spaces as indicated on the Site Plan. One

handicap van-accessible universal stall in accordance with January 1998 Accessibility Guidelines for Buildings and Facilities, Appendix (with striping, signage, and ramps) shall be provided for the parking lot. Adjustments to the parking lots as shown may be made but must be approved by the Government. Regular parking stalls shall be a minimum of 2.74 wide and 5.48 m long. Driving lanes shall be a minimum of 7.92 m wide. Parking stalls shall be delineated with 100 mm white stripes. Provide concrete curb and gutter as shown on the Site Plan. Pavement edges not receiving curb and gutter shall have a 3 m graded shoulder.

1.6.5. Screen Walls/Dumpster Enclosure

Construct screen walls to block the view of exterior mechanical/electrical equipment and dumpster area from vehicular and pedestrian traffic. Top of screen wall shall be no less than the top of any portion of the mechanical equipment. Screen walls shall be finished in the materials indicated. The dumpster enclosure shall be a minimum of 4.26 m wide by 3.46 m deep by 2.29 m high, and have steel access gates as indicated. The aesthetics of the new facility, and easy access to the dumpster by the servicing truck shall be the major considerations of the chosen location for the dumpster enclosure. Location of the enclosure shall be as shown on the attached drawing.

1.6.6. Utilities

New utility service lines shall consist of sanitary sewers, waterlines, gas lines, and electrical power and communications lines.

1.6.6.1. Gas

Gas service will be obtained by hot tapping an existing 254 mm, 344.74 Kpa (50 psi), gas line located immediately to the North of the Medical/Dental Clinic and extending a gas line to the Medical/Dental Clinic where a gas regulator and meter will be set. The gas distribution systems shall be designed in accordance with FNPA-54, and shall meet the requirements of UFGS Section 02556 GAS DISTRIBUTION.

1.6.6.2. Water

Water service line shall wet tap into the existing 200 mm water line located on the east side of the existing parking lot. The new water line will extend west to the Medical/Dental Clinic and then shall loop around the site as indicated until connecting to the existing water main by way of wet tap on the east side of the existing parking lot. A flow test was conducted on August 23, 2000 and indicated the following results: a static pressure of 510.21 Kpa (74 psi) with a residual pressure of 399.90 Kpa (58 psi) while flowing at a rate of 2797.42 L/min (739 gpm). However, the Contractor shall perform fire hydrant flow tests prior to designing the fire protection system for the Medical/Dental Clinic. See paragraphs at the end of this section relating to water service requirements.

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1.6.6.3. Sanitary Sewer

Sanitary sewer connection shall be to the existing manhole located to the west of the Medical/Dental Clinic. See paragraphs at the end of this section relating to sanitary service requirements.

1.6.6.4. Electric and Communications

Communication shall consist of new duct bank, cable and manholes. Communications will be provided from the Operations Support Facility, and installed in new and existing duct bank. Underground primary power and pad-mounted transformer shall be provided by the Contractor and shall be located in a screened area dedicated for Mechanical/Electrical Equipment. See SECTION 01007 ELECTRICAL REQUIREMENTS for additional information and requirements.

1.6.7. Landscaping

Landscape plan shall be designed to visually-enhance the new facility with color, form and screening, while providing shade and windbreak for the new building. Landscaping shall be in the quantities and general design of that shown on the plans. Trees closer than 9 m to the building shall be chosen and arranged to meet "force protection" guidelines; i.e., very low-growing evergreen groundcovers with ornamental trees. Larger and denser trees and shrubs shall be planted at least 24 m from the building.

Landscaping shall consist of low maintenance balled and burlapped trees and container-grown groundcover. Plant materials shall be climatized to the local area for a period of one growing season prior to planting. Plantings shall be chosen from Appendix E of Schriever AFB General Plan, "Plant Species Palette for SAB". (Also, see Master Plant List included as an appendix item in this RFP Project Manual.) Mulch trees to a minimum diameter of 1500 mm or 600 mm beyond the tips of tree branches and shrub planting beds with a 75 mm thick surface of washed stone. Mulching for individually planted trees in lawn areas and evergreen trees in windbreaks east of the building shall use washed stone 125 mm thick. Plant beds not bordered by pavement shall be edged with commercial-quality black metal edging. Landscape plantings shall be specified in UFGS Sections 02930 EXTERIOR PLANTING and 02935 EXTERIOR PLANTING MAINTENANCE.

1.6.8. Turf

1.6.8.1. Soil Preparation

Prior to seeding or sodding, all surface soils shall be loosened to a minimum depth of 300 mm and broken up to a fine, workable texture suitable for seeding and sodding. Areas within the limits of sod and irrigation shall have 2.5 cubic meters per 100 square meters of manure worked into the top 150 mm of soil.

1.6.8.2. Seeding and Sodding

All disturbed areas shall be seeded or sodded. All sodded areas for Basic bid shall have a permanent irrigation system provided under the Basic bid. Turfed areas shall be seeded in accordance with paragraph 1.6.9.4 herein.

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See the Landscape plans for exact locations. Existing sodded areas that are disturbed as a result of construction activities shall be restored to their original condition within seven (7) days after any disruption or damage. All other areas, including those disturbed by contractor's staging activities, not otherwise surfaced, shall be seeded with field grass. All newly turfed areas shall be fertilized with 18-46-0 fertilizer at the rate of 2.25 kg per 100 square meters per acre. All seeded areas shall be seeded by hydromulching techniques using 34 kg of green-tinted wood-fiber hydromulch per 100 square meters drilling with a Brillion-type seeder or broadcast seeded. Seeding and sodding shall be specified in UFGS Sections 02921 SEEDING and 02922 SODDING.

1.6.8.3. Sod

Sod shall be state-certified as classified by applicable state laws. Sod shall be locally grown and be comprised of a mixture of improved varieties of Turf Type Tall Fescue. It shall be free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 50 mm in any dimension, woody plant roots and other material detrimental to a healthy stand of turf. Dry moldy, yellow, irregularly shaped, torn or uneven end sod pieces shall be rejected. Sod shall be machine cut to a uniform thickness of 30 mm within a tolerance of 6 mm, excluding top growth and thatch. Measurement for thickness shall exclude top growth and thatch. Sod anchors shall be used as recommended by the sod supplier.

1.6.8.4. Seeding

Bluegrass seed mixture

Mixture	% Mixture	Kg per 100 Sq Meters
Turf Type Tall Fescue	100	3.63
		(8 lbs per 1000 sf)

Weed seed shall not exceed 1 percent by weight of the total mixture. Wet, moldy, or otherwise damaged seed shall be rejected. Seed mixing shall be performed by the seed supplier prior to delivery to the site. Bulk quantities of seed shall be labeled.

1.6.9. Irrigation Sprinkler System

The lawn irrigation system shall be specified in UFGS Section 02811 UNDERGROUND SPRINKLER SYSTEMS.

a. All sodded areas shall be lawn irrigated. Existing irrigation lines or components disturbed by construction activities shall be replaced or restored to their original working condition within two (2) days after being damaged or shut down.

b. The irrigation system shall consist of standard, commercially-available components. The components shall be products of manufacturers regularly engaged in the manufacture of such items and shall essentially duplicate those that have been in satisfactory operation at Schriever AFB for at least two years.

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c. The sprinkler system shall be completely underground, automatically operated by a central sprinkler controller, and capable of providing the required amount of water to the lawns and newly planted trees as required in this contract. The lawn sprinkler pop-up heads shall be designed to be adjustable for coverage and flow. Water to irrigate the trees and shrubs shall be supplied by a drip irrigation system. Irrigation system shall operate through a backflow prevention device with inline pressure regulating devices, filters, control valves, vacuum relief valves, flush valves, and pressure compensating drip heads. Supply all necessary tools and equipment for complete installation.

d. Head spacing shall not be less than the manufacturer's recommendations for the type and sizes of trees and shrubs installed and the area of turf to be sprinkled. The Contractor shall submit design calculations for review on this matter. The Contractor shall also provide design drawings that include typical head spacing, system layout, pipe size, layout, and pressures. All components shall be shown on the irrigation plans for review.

e. A reduced pressure principle backflow preventer shall be installed between the irrigation system and the potable water system. The backflow preventer shall be installed in the mechanical room. A strainer shall be installed upstream of the backflow preventer with a screening element compatible with the emitters or sprinkler heads used and as recommended by the manufacturer. Provide a self-draining, freeze-proof, shut-off valve upstream of the backflow preventer and strainer. Vacuum breakers shall not be used in lieu of the reduced pressure principle backflow preventer. The system shall also be equipped with a quick coupler valve immediately outside the building for blowing water out of the system at the end of the season. The air connection shall be located downstream of the backflow preventer and strainer.

f. High points in the irrigation system shall be equipped with a combination air/vacuum relief valves.

1.7. PAVEMENTS

1.7.1. Pavement Sections

The Contractor shall be responsible for design of all pavements using the traffic information provided below. Design of pavement structures for access streets and parking areas shall be determined by the Contractor using the methods described within AFM 88-7, Chapter 1. AFM 88-7, Chapter 1 includes procedures for determining the thickness of flexible and rigid pavements. Pavement design calculation sheets for the procedures contained in AFM 88-7, Chapter 1 are included as an attachment at the end of the RFP, Attachment No. 3. Pavements for permanent installations shall be designed for a life of 25 years. Pavements at Schriever AFB shall be designed for seasonal frost conditions. Soil data for the pavement design shall be obtained from the attached Foundation Analysis Report at the end of the RFP (Appendix "A"). Any additional soil data required by the Contractor shall be obtained by the Contractor at his expense.

1.7.1.1. Parking Areas, Service area and Access Road

Pavement shall be flexible hot-mix asphalt type. The pavement shall be designed for an Average Daily Traffic (ADT) of 400 vehicles (total vehicles for all lanes in both directions). The traffic composition consists of: 99 percent passenger cars, panel trucks and pickup trucks and 1 percent two-axle and three-axle trucks. Portions of the pavement that will be used by garbage trucks to service dumpsters shall be designed accordingly. The pavement shall also be designed to support occasional traffic from snow plows.

1.7.2. Sidewalks

P.C. concrete sidewalks shall be a minimum of 100 mm thick. Transverse contraction joint spacing shall be equal to wide unless indicated otherwise. Expansion joint spacing shall not exceed 12.2 m.

1.7.3. Pavement Specifications

Pavements shall be constructed in accordance with Colorado Highway Specifications where indicated. Unless otherwise specified, unit price clauses in specifications shall be deleted. These requirements shall be incorporated into the Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS. The Contractor shall be responsible for editing this specification.

1.7.3.1. Bituminous Wearing Course

Bituminous wearing course shall conform to the requirements in the Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS. The maximum size aggregate used in bituminous concrete shall be approximately equal to, but always less than 1/2 the wearing course thickness and 2/3 the intermediate course thickness. The total thickness of bituminous concrete shall not be less than 50 mm. Where the total thickness of bituminous concrete requires more than one lift, an intermediate course may be specified beneath the wearing course.

1.7.3.2. Bituminous Prime Coat

A bituminous prime coat shall be used at the option of the Contractor. Bituminous prime coat will be used when it is anticipated that the constructed base course may be damaged by rain, wind, or traffic prior to placement of the bituminous concrete pavement. Bituminous prime coat shall conform to the requirements found in Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS. Bituminous prime coat shall be: liquid asphalt conforming to the requirements of ASTM D 2027, designation MC-30 or MC-70, at the Contractor's option, except that only MC-30 shall be used on dense graded base courses if MC-70 does not adequately penetrate the base course material. In lieu of cut-back asphalt, the Contractor may use cationic emulsified asphalt conforming to the requirements of ASTM D 2397, designation CSS-1 or CSS-1h.

1.7.3.3. Bituminous Tack Coat

Contact surfaces of previously constructed pavement, curbs, manholes, and other structures shall be sprayed with a thin coat of bituminous material conforming to the requirements found in Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS. Unless otherwise directed or required, bituminous material shall be emulsified asphalt conforming to the requirements of ASTM D 977, designation SS-1 or SS-1h or cationic emulsified asphalt conforming to the requirements of ASTM D 2397, designation CSS-1 or CSS-1h.

1.7.3.4. Aggregate Base Course

Aggregate base course shall conform to the requirements found in Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS and shall have a California Bearing Ratio (CBR) of at least 80. The following requirements shall be incorporated into the aggregate material specifications:

"Disintegrated granite shall not be used for production of any aggregate and the processed aggregate shall contain not more than 2.0 percent by weight of disintegrated granite particles in that portion of the total sample larger than the 4.75 mm sieve and not more than 4.0 percent in any individual sieve size listed in the required aggregate gradation for that portion larger than the 4.75 mm sieve. A disintegrated granite particle is defined as a soft, crumbly particle of igneous rock having a visible crystalline grain size and consisting essentially of feldspar and quartz with lesser amounts of micas and/or amphibolies and pyroxenes. Generally, the rock particle will be stained by iron oxide and the feldspar grains will have a dull, highly fractured appearance. The individual mineral grains are so weakly bonded that the particle will crumble under moderate pressure. When tested by Test Method COE CRD-C 130 the particle would be classified as soft."

1.7.3.5. Full Depth Asphalt

In lieu of the layered system of asphalt pavement design, a full-depth asphalt design may be used if it is found to be more economical than a conventional pavement system and is approved by the Government. Full depth asphalt design shall conform to AFM 88-7, Chapter 1 with the bituminous surface and intermediate asphalt layers conforming to the Colorado State Highway Specifications.

1.7.3.6. Concrete Sidewalks, Double Purpose Walks, and Curbs and Gutters

Concrete sidewalks and curbs and gutters shall be specified in Omaha District guide specification Section 02560 (COLORADO) PAVEMENTS FOR SMALL PROJECTS. Expansion joints in P.C. concrete sidewalks shall be sealed with cold-applied sealant which is stone or grey in color.

1.8. GRADING

1.8.1. General

Positive drainage shall be provided for all areas and existing drainage ways shall be utilized to the extent possible. It is desirable to direct

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drainage away from buildings to curb and gutter and or to a new perimeter ditch located on west side of the Medical/Dental Clinic. Swales between buildings and parking areas shall be avoided, if possible. Parking areas shall be graded such that storm water is directed off to the sides and not down the center of the parking area. Drainage along the new entrance drive shall be controlled by the use of shoulders and ditches. Grading shall be specified in the Omaha District guide specification Section 02210 GRADING. The Contractor shall be responsible for editing the specification for the project.

1.8.2. Borrow and Waste

Borrow material shall be obtained from sources outside the limits of Schriever AFB. The source of borrow material shall be the Contractor's responsibility. The Contractor shall obtain from the owners the right to procure material, shall pay all royalties and other charges involved, and shall bear all the expense of developing the sources, including rights-of-way for hauling. Borrow material shall be free from hazardous and toxic waste. Excess waste material shall be disposed of by the Contractor at his own expense and responsibility outside the limits of Schriever AFB.

1.8.3. Sidewalks

Concrete walks shall have a transverse grade of 2 percent. A desirable maximum longitudinal walk grade will be 4 percent with an absolute maximum of 8 percent. Handicapped accessible walks with a longitudinal slope greater than 5 percent shall be considered a ramp. See FED STD 795 Uniform Federal Accessibility Standards for ramp requirements. Special attention shall be given to sidewalks that are on the north (shaded) side of buildings. These walks should be designed to ensure a freeze/thaw cycle does not result in the formation of ice on the walk. Ice on walks should be a safety consideration for all areas. The use of steps in walks will be avoided whenever possible. The use of single riser steps is especially discouraged. When steps are unavoidable, they should have at least three risers and will be provided with handrails.

1.8.4. Transverse Parking Area Grades

a. Desirable minimum of 2 percent.

b. Absolute minimum of 1.5 percent for flexible pavement and 1 percent for rigid pavement.

1.8.5. Longitudinal Parking Area Grades

Maximum of 4 percent.

1.8.6. Ramp Grades

a. Desirable maximum of 7 percent.

b. Absolute maximum of 10 percent for short distances only.

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1.8.7. Gutter Grades

- a. Desirable minimum of 0.8 percent.
- b. Absolute minimum of 0.5 percent.

1.8.8. Building Floor Elevation

Building finished floor elevation shall be set to ensure that the required minimum and maximum grades are met.

1.8.9. Grades Away From Building

- a. Minimum of 5 percent for 3 m.
- b. Maximum of 10 percent for 3 m.

1.8.10. Overlot Grades

Provide positive drainage for all areas.

- a. Minimum 1 percent for cohesionless sandy soils.
- b. Minimum 2 percent for cohesive soils or turfed areas.
- c. Side slopes for ditches, roads, and other turfed areas shall be no steeper than 1V on 3H.

1.8.11. Adjustment of Existing Structures

All manholes, valve boxes, handholes or inlets of any nature within the project that do not conform to the new finish grade in either surfaced or unsurfaced areas shall be adjusted to the new finish grade. Where inlets, manholes, valve boxes, or handholes fall within a surfaced or unpaved roadway or parking, the existing frames and cover shall be removed and replaced with a heavy-duty frame and cover. The structure shall be adjusted as needed to fit the new conditions.

1.9. ROAD GEOMETRIC DESIGN

Horizontal and vertical alignment shall be designed in accordance with AASHTO "A Policy on Geometric Design of Highways and Streets".

1.10. STORM DRAINAGE

1.10.1. Determination of Storm Runoff

For areas of up to about 2 square kilometers, where only peak discharges are required for design and extensive ponding is not involved; the computation of runoff may be accomplished by the Rational Method. For larger areas, when suitable unit-hydrograph data are available or where detailed consideration of ponding is required, computation should be by unit-hydrograph and flow-routing procedures. Sizing of storm drainage systems as well as roadway shall be based on rainfall of 10-year frequency.

1.10.1.1. Design Storm Return Period

Storm drains and culverts shall be sized for a design storm with a return period of 10 years. Provisions shall be made to protect all buildings and critical structures from a major storm with a return period of 100 years.

1.10.1.2. Rainfall Depth-Duration-Frequency Data

Rainfall data for states in the western United States shall be obtained from NOAA ATLAS 2. Rainfall intensity-duration data developed by cities or regions may be used if available.

1.10.2. Storm Drainage System Layout

The Contractor shall be responsible for the complete design of the storm drainage system. The new storm drainage system shall be coordinated with surrounding properties to ensure runoff does not cause damage to the other properties. Sheet flow shall be the preferred way of draining lawn areas. Drainage along the new entrance drive shall be controlled by the use of ditches. Contractor shall keep the number of drainage structures to a minimum. Erosion control shall be provided for all storm drain structures. The storm drainage system shall be specified in UFGS Section 02630 STORM DRAINAGE SYSTEM. All specification submittals shall be designated "FIO". Submittals of pipe samples are not required. The Contractor shall refer to the Corps of Engineers standard details for any storm drain details required by the design. The standard details are available at the Corps FTP site. The Contractor shall provide details for any other drainage structures not found in the Corps standard details. Under no circumstance shall storm drain lines be located beneath buildings.

1.10.2.1. Manholes

Diameter of manholes shall be large enough to accommodate pipes entering and exiting the manhole.

1.10.2.2. Headwalls and Flared End Sections

Unless otherwise approved, headwalls or flared end sections shall be provided at the entrance and ends of culverts and at storm drain outfalls. Outlets and endwalls shall be protected from undermining, scour, lateral erosion and degradation of the downstream channel by use of appropriately designed/sized rip-rap.

1.10.2.3. Culverts

Culvert pipes shall have a minimum diameter of 450 mm wherever possible.

1.10.2.4. Roof Drain Outfall Lines

Downspouts and/or roof drains from the east side of the Medical/Dental Clinic shall be connected to an underground roof drain system. Roof drain outfall lines beyond 1.5 m from the building shall be of the same materials as the exterior storm drainage system. Minimum diameters shall be 300 mm for lengths over 15 m and 200 mm for lengths under 15 m. In addition, the diameter shall be at least 50 mm larger than the diameter of the line as it

leaves the building. All changes in direction of outfall lines shall occur at storm drain structures except that cleanouts may be used in lines smaller than 300 mm.

1.10.3. Storm Drain and Culvert Pipe

The Contractor shall select the appropriate storm drain and culvert pipe materials from the options specified in UFGS Section 02630 STORM DRAINAGE SYSTEM. Pipe, bedding, and backfill shall be of adequate strength (or stiffness) to support the earth, live, and construction loads imposed on the pipe. Only pipe materials which have a minimum design service life of 25 years shall be allowed for permanent installations. As a minimum, all pipe joints shall be soil-tight. The Contractor shall specify watertight joints when the water table is at or above the pipeline.

1.10.3.1. Concrete Pipe

Reinforced concrete pipe shall be a minimum Class III. Type I cement may be used only when sulfates in the soil are 0.1 percent or less and dissolved sulfates in the effluent are 150 ppm or less. Type II cement may be used only when sulfates in the soil are 0.2 percent or less and dissolved sulfates in the effluent are 1,500 ppm or less. Only Type V cement may be used if sulfates in the soil exceed 0.2 percent or dissolved sulfates in the effluent exceed 1,500 ppm. Concrete culverts and storm drains shall be protected by a minimum of 1.0 m of cover during construction to prevent damage before permitting heavy construction equipment to pass over them during construction.

1.10.3.2. Corrugated Metal Pipe

The service life of corrugated metal pipe shall be the sum of the lives of the nonmetallic protective coating, the metallic protective coating, and the basic metal pipe. The life of the basic metal pipe and metallic protective coating shall be the time to first perforation. The time to first perforation for corrugated steel pipe shall be determined using the California Chart (California Division of Highways Test Method 643-B). Corrugated metal pipe shall not be allowed in areas where previous satisfactory service has not been achieved. Zinc-coated corrugated steel pipe shall not be allowed if the soil and water pH is less than 6 or greater than 8 or the minimum soil resistivity for the site is less than 2,500 ohm-cm. Aluminum-coated corrugated steel pipe shall not be allowed if the soil and water pH is less than 6 or greater than 9 or the minimum soil resistivity for the site is less than 1,500 ohm-cm. Stiffness of the corrugated metal pipe and soil envelope shall be such that the predicted long-term deflection shall not exceed 5.0 percent. Corrugated metal culverts and storm drains shall be protected by a minimum cover as recommended in Section 26 of AASHTO HB-16 during construction to prevent damage before permitting heavy construction equipment to pass over them during construction.

1.10.3.3. Plastic Pipe

Stiffness of the plastic pipe and soil envelope shall be such that the predicted long-term deflection shall not exceed 7.5 percent. Plastic culverts and storm drains shall be protected by a minimum of 1.0 m of cover

during construction to prevent damage before permitting heavy construction equipment to pass over them during construction. Split couplers shall not be allowed for corrugated high-density polyethylene pipe.

1.11. TRAFFIC SIGNAGE AND STRIPING

Traffic signage and striping shall be provided for all new roads and parking areas. Signage and striping shall be designed in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways. Parking areas shall be striped with non-reflectorized paint. Roads and streets shall be striped with reflectorized paint. Traffic signs shall be specified in the Omaha District guide specification Section 02440 TRAFFIC SIGNS. An unedited version of Section 02440 has been included as an attachment for information only. The Contractor shall be responsible for editing the specification for the project. See end of the RFP, Attachment No. 3. Pavement markings shall be specified in UFGS Section 02763 PAVEMENT MARKINGS. All specification submittals shall be designated "FIO".

1.12. EROSION AND SEDIMENT CONTROL

The Contractor shall be responsible for selecting and implementing Best Management Practices (BMPs) to minimize pollutants in storm water discharges associated with construction activity at the construction site. All erosion and sediment measures and other protective measures shall be maintained by the Contractor in effective operating condition. All temporary structural practices shall be removed once the corresponding disturbed drainage area has been permanently stabilized. In the State of Colorado, EPA has authority for the National Pollutant Discharge Elimination System (NPDES) on Federal Facilities. If construction activities results in the disturbance of 5 acres of land or more, coverage under the EPA Storm Water General Permit For Construction Activities (Colorado Permit No. COR10*##F) is required. The Contractor and the Omaha District Corps of Engineers shall be co-permittees. The Contractor shall be responsible for applying Specification Section 01565 NPDES PERMIT REQUIREMENTS FOR STORM WATER DISCHARGES FROM CONSTRUCTION SITES. If coverage under the NPDES General Permit is not required, Specification Section 01565 shall not be applicable.

1.12.1. Temporary Construction Entrance

Tracking of mud from the construction site onto adjacent roads and streets shall be kept to a minimum. A temporary stabilized stone pad shall be constructed at points where vehicular traffic will be leaving the construction site and moving directly onto a paved road or street. It shall extend the full width of the vehicular ingress and egress area and have a minimum length of 21.3 meters. The entrance shall be maintained in a condition which will prevent tracking or flow of mud onto adjacent roads or streets. If conditions on the site are such that the majority of the mud is not removed by the vehicles traveling over the stone, the tires of the vehicles shall be washed before entering the road or street. Any mud which is tracked onto roads or streets shall be removed at least once daily.

1.12.2. Erosion Control Blanket

Bottoms and side slopes of ditches and any other disturbed slopes 1V on 3H or steeper shall be covered with an erosion control blanket immediately after seeding.

1.12.3. Silt Fence

Silt fencing shall be installed below disturbed areas where erosion would occur in the form of sheet and rill erosion. The size of the drainage area above the silt fence shall not exceed one fourth of an acre per 30 m of silt fence length. Silt fencing may be installed across ditches only when the maximum contributing drainage area is not greater than 1 acre. Silt fence constructed across a ditch shall have wire support and shall be of sufficient length to eliminate endflow.

1.12.4. Straw Bale Barrier

Straw bale barriers may not be installed across ditches.

1.12.5. Storm Drain Inlet Protection

Storm drain inlet protection shall be installed around any new or existing storm drain inlets that will become operational before permanent stabilization of the corresponding disturbed drainage area has occurred. Storm drain inlet protection shall include either a sediment filter or an excavated area around the storm drain inlet.

1.12.6. Rock Check Dam

Rock check dams may be installed in ditches which drain 0.81 to 4.05 hectares. The allowable drainage area will be dependent on the gradation of the rock used to construct the check dam. The maximum height of the dam shall be 1.0 m. The center of the dam shall be at least 150 mm lower than the outer edges. For added stability, the base of the check dam may be keyed into the soil approximately 150 mm. The maximum spacing between the dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.

1.12.7. Temporary Sediment Trap

Temporary sediment traps may be constructed below disturbed areas where the total drainage area is less than 3 acres.

1.12.8. Temporary Sediment Basin

Temporary sediment basins may be constructed below disturbed areas where the total drainage area is equal to or greater than 3 acres.

1.12.9. Other Controls

Other controls such as diversion dikes, level spreaders, temporary seeding, etc. may be used if deemed necessary by the Contractor.

1.13. COMPOSITE UTILITIES

Prior to the start of any excavation, the Contractor shall field verify the exact location and depth of all underground utilities. The Contractor shall not run utilities underneath buildings. The Contractor shall avoid running utilities underneath streets and parking lots where practicable. In cases where it is necessary for the utilities to cross existing streets, the Contractor shall install the lines by trenchless excavation methods. No open trenching will be allowed through existing streets, unless written permission is obtained and approved by Schriever AFB.

1.13.1. CATHODIC PROTECTION

Corrosion protection shall be provided for all buried gray or ductile-iron piping, fittings, valves, and other water line appurtenances, regardless of pipe material. Corrosion protection shall consist of an anode type cathodic protection system. See SECTION 01007 ELECTRICAL REQUIREMENTS.

1.13.2. WATERLINES

a. Waterlines shall be designed and constructed in accordance with the combination of the State of Colorado Department of Public Health and Environment's "*Design Criteria for Potable Water Systems (Revised March 31, 1997)*" and the Corps of Engineers Guide Specifications, Technical Manuals (TM), Engineering Manuals (EM), Military Handbooks (MH), and the industry standards listed herein. In the event of conflict, the Contractor shall follow the Local or State requirements/criteria (whichever are more stringent) which govern the waterlines. In addition to the State of Colorado criteria listed above, water distribution systems and service lines shall be designed and constructed in accordance with TI 814-01, TM 5-813-5, TM 5-813-7, and UFGS Section 02510 WATER DISTRIBUTION SYSTEM. The Contractor shall be responsible for protection of existing waterlines. If any potable waterlines are damaged during construction, the Contractor must immediately notify the Contracting Officer. The Contractor shall disinfect all new water lines and any remaining lines which do not remain fully pressurized during construction or connection. The Contractor shall notify the Contracting Officer seven (7) days prior to disinfection of the water lines. The disinfection shall be in accordance with the American Water Works Association Standard AWWA C651, and shall not be considered complete until two consecutive days of bacteriological samples show no contamination. All bacteriological, lead and copper tests shall be performed by Environmental Protections Agency (EPA) certified laboratories. Copies of results of the analyses shall be forwarded to the Contracting Officer upon receipt.

b. The Contractor shall design and provide all facilities required to deliver water to the project. Service connections or extensions to the existing water distribution system shall be made without interruption to service. Sizing of the domestic water service lines for the new facility served shall be determined in accordance with the National Standard Plumbing Code Fixture Count Method. For design of the waterlines, use maximum Hazen-Williams "C" value of 130 for plastic pipe and 120 for other pipe materials.

1.13.2.1. Water Distribution and Service Lines

a. Flow Requirements

Water shall be supplied by service lines of appropriate capacity to provide the flows determined to be necessary to meet all requirements of the new facility. The requirements for sizing the water lines include all domestic use, interior and exterior fire protection water, and lawn sprinkler/irrigation systems, as required. All new distribution lines shall be tied into the existing 200 mm water line discussed above.

b. Service Connections

A maximum velocity of 1.524 meters per second shall be used for metallic piping and 2.44 meters per second shall be used for nonmetallic piping. Service connections shall be made via corporation stops, appropriate gooseneck connections, or tapping sleeves and valves. The number and maximum size of corporations stops shall be as specified in the UFGS Section 02510 WATER DISTRIBUTION SYSTEM.

c. Dewatering, Hydrostatic Testing, and Flushing of Lines

The Contractor shall be responsible for implementing the terms and requirements of SECTION 01410 ENVIRONMENT PROTECTION for dewatering, hydrostatic testing, and flushing of lines after disinfection.

d. Domestic Service Stop Valve

Building shall be provided with separate service and stop valves in areas readily accessible to maintenance and emergency personnel. Stop valves located in walks are prohibited.

1.13.2.2. Dedicated Fire Water Service Lines

a. Fire Flow Data

Schriever AFB has a direct pressure water distribution system. A thorough understanding of that system is critical to the design of the fire suppression systems. For determination and documentation of fire protection, the Contractor shall conduct and provide all fire hydrant flow tests. Data to be recorded with the flow tests are static pressures, residual pressures, flowrates, pump status, date and time tests were conducted, and name of personnel conducting the fire hydrant flow tests. The static pressures, residual pressures, flowrates, test hydrant and flow hydrants shall be shown on the appropriate contract drawings. Fire hydrant flow tests required for fire protection design shall be made in accordance with the procedures specified in AWWA M17, (Installation, Field Testing, and Maintenance of Fire Hydrants). The Contractor shall coordinate with the Schriever AFB Fire Department and Base CE prior to conducting such tests. The Contractor shall submit fire hydrant flow test data with the design calculations.

b. Fire Hydrants

The Contractor shall be required to install fire hydrants for the new facility. One fire hydrant shall be located within a minimum of 45 m of the building fire department connection. All other hydrants shall be located in accordance with Military Handbook MH 1008C. Fire hydrant styles shall meet the requirements of Schriever AFB.

c. Dedicated Fire Line

The Contractor shall be required to provide a separate fire water service line to the building for interior fire sprinkler protection in accordance with NFPA 24, and Military Handbook (MH) 1008C. The fire water service line to the building shall be equipped with a Post Indicator Valve (PIV) that can be readily located by the fire department. The PIV shall not be placed closer than 12 m to the building it is serving and shall be provided with a tamper switch connected to the building fire control panel. The PIV shall be protected by 150 mm steel pipe bollards, filled with concrete, painted and spaced in accordance with Schriever AFB requirements.

1.13.2.3. Sprinkler Irrigation Systems

See paragraph: NEW CONSTRUCTION for irrigation system requirements.

1.13.3. WASTEWATER

Wastewater lines shall be designed and constructed in accordance with the combination of the State of Colorado, Dept. of Public Health and Environment, "*Design Criteria Considered in Review of Wastewater Treatment Facilities, Policy 96-1*" and the Corps of Engineers Guide Specifications, Technical Manuals (TM), Engineering Manuals (EM), Military Handbooks (MH), and the industry standards listed herein. In the event of conflict, the Contractor shall follow the Local or State requirements/criteria (whichever are more stringent) which govern the wastewater lines.

1.13.3.1. Design Criteria

In addition to the State and Local criteria listed above, the sewage system shall be designed in accordance with TI 814-10, TM 5-814-1, TM 5-814-2, and U. S. Army Corps of Engineers Guide Specification Sections 02531 SANITARY SEWERS. No interruption of service shall be allowed on the existing sanitary sewer line. The Contractor shall coordinate the sequencing of construction as it affects the existing sanitary sewer line with the Contracting Officer. Exterior building sanitary sewer service lines shall be 150 mm minimum diameter. All design slopes will be calculated using the Manning formula. The Contractor shall provide all calculations.

1.13.3.2. Manholes

Manholes are required at all changes of direction, slope, and size. Manholes shall be spaced not more than 91.4 m apart. Manholes shall be located at intersections of streets when possible. Avoid placing manholes where the tops will be submerged or subject to surface water inflow. Where the invert of the inlet pipe would be more than 450 mm above the manhole

floor, a drop connection will be provided. The Contractor shall provide all calculations.

1.13.4. Sewer Mains

The peak diurnal and extreme peak flowrates shall be calculated according to TM 5-814-1. Curved sewers are prohibited. Pipes shall be designed to provide a minimum velocity of 0.6096 meters per second at the average hourly flowrate, and a minimum velocity of 0.762 to 1.067 meters per second at the peak diurnal flowrate. Maximum velocity shall be 3.048 meters per second.

1.13.5. Gas Distribution System

See SECTION 01006 MECHANICAL REQUIREMENTS for instructions and engineering information relating to the design of the interior gas system.

1.14. EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

1.14.1. Trenches

A trenchless excavation method shall be required when an underground utility line crosses any roadway. Sewer and water lines, mains or laterals, shall be placed in separate trenches. The separate trenches shall maintain a minimum horizontal separation of 3 m and the bottom of the water line shall be at least 450 mm above the top of the sewer. Sewers crossing above potable water lines shall maintain a vertical separation of 450 mm and must be constructed of AWWA approved pressure pipe or fully encased in concrete for a distance of 3 m on each side of the crossing.

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Bedding and initial backfill material shall be in accordance with the manufacturers recommendations. Where no manufacturer's installation manual is available, trench walls shall be excavated to a stable angle of repose as required to properly complete the work. Trench excavations shall adhere to requirements prescribed in EM 385-1-1, September 1996, Safety and Health Requirements Manual. Special attention shall be given to slopes, which may be adversely affected by weather or moisture content. Excavation, trenching, and backfilling shall be performed in accordance with the UFGS Section 02316 EXCAVATION, TRENCHING AND BACKFILLING FOR UTILITIES SYSTEMS.

2. PART 2 NOT USED

3. PART 3 NOT USED

-- End of Section --

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SECTION 01003

ARCHITECTURAL BUILDING REQUIREMENTS

1. PART 1 ARCHITECTURAL BUILDING REQUIREMENTS

1.1. ARCHITECTURAL CONCEPT

The concept plan for the Medical/Dental Clinic places the Dental Clinic function along the eastside of the facility. Natural daylighting (a required feature) is provided to the DTRs. Growth in this new facility is expected to result from family housing being built on the Base. Because the Medical Clinic would provide care to the dependents in this proposed housing and the Dental Clinic would not, growth for the facility is expected to be primarily in the Medical Clinic portion of the building. The site provides expansion potential to the west of the new building so the location of the Dental Clinic function on the east and the Medical Clinic function in the center and west of the facility is an ideal arrangement to allow expansion of the Medical Clinic.

1.1.1. Arrangement

The Medical Clinic is arranged in a manner similar to one-half of a module in the "Clinic of the Future" concept. The Copier/Distribution element has been utilized to provide a "Hot Desk" contiguous with the reception area and the Medical Records room to provide a Clinic control point that can function with a minimal staff capable of manning several functions in quick succession without ever being away from the reception desk. The reception desk also is focused on the blood drawing/stat lab/specimen toilet cluster, so that it can partially man that location or at least control access to it. The Conference/Training Room is located just behind the Reception Area for several reasons. The Conference/Training Room can be used by the staff for meetings. It can also be used for patient education after the patients have assembled in the waiting area. It can be accessed from the rear staff corridor for general staff use. The Conference/Training Room can be used in an expansion scenario for an expanded Medical Records area and the existing Medical Records Room can become an additional interaction station.

1.1.1.1. Physical Exam and the BEE Areas

The Physical Exam and the BEE areas are arranged, so that they can be transformed in the future. The General Storage area provides a location for a future Provider Cubical area in the future expansion scenario, which will require an enlarged supply area as well.

1.1.1.2. Radiology and Pharmacy

During the Charrette process, Radiology was added to the program requirements, and the Pharmacy was enlarged. Reductions in other Program requirements were made to maintain the overall allowable total gross area. The net area, therefore, provides the required functional components of the facility.

1.1.2. Metric Measurement

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The facility design is based upon metric measuring units. All dimensions shown on Architectural sheets are indicated in millimeter (mm) units. The overall design and configuration can be altered subject to government approval submitted as a variance and as long as the square meter area is not exceeded. Design alterations will be allowed as required for material modular sizing considerations, economy of detail connections, access for utilities and handicap provisions.

1.1.3. Design Philosophy

The design is a single story facility complying with the functional layout provided in the concept solution presented. The exterior features will reflect the base standard for facilities that are located outside the fence area. Building materials for the exterior of this facility will match building materials used on the Operational Support facility (OSF) that is located to the east of this project site along Falcon Parkway.

1.1.4. Building Layout

The layout of the floor plan and elevations should be adhered to insofar as possible in the final design. Slight adjustments to allow for fixtures and circulation to better serve the client may be allowed subject to government approval. Wall configurations can be slightly altered to conform to equipment requirements and type of wall construction selected; however, Program for Design and net to gross area limitations and total gross area allowed must be complied with.

The layout of the mechanical, electrical and communication spaces are suggestive and may require wall configurations to be slightly altered to conform to equipment and spacing requirements.

Columns shall not be allowed within any of the room spaces as laid out on the enclosed floor plans, unless otherwise shown on the drawings. All columns shall be located within walls where they may occur. Protrusions of in-wall columns shall be minimized. These column locations however, shall be coordinated fully with equipment, specialties, and furniture and systems furniture layouts so as not to impact the function of such items.

Provisions in the design and construction of the facility shall be made to accommodate building movement and expansion both during construction and after the facility is completed and occupied. With large floor and roof areas as for this project, structural steel and roof framing shall accommodate movement from expansion and contraction due to temperature differentials that will seasonally occur and throughout the day, without damage to adjacent areas, and connections to structural and other elements.

Fire separation walls and egress from the facilities shall meet or exceed the requirements of NFPA 101 - Life Safety Code. See Section 01008 FIRE PROTECTION REQUIREMENTS. This facility will be completely fire sprinklered as part of the requirement.

1.2. DESIGN CRITERIA

The unedited Unified Facilities Guide Specifications (UFGS) shall be edited for technical content and provide to serve as the minimum design standards established for this project. Design publications listed in each

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specification section shall be used as sources of criteria for design. The criteria from these sources may be supplemented, but not supplanted, by applicable criteria contained in nationally recognized codes, standards, and specifications.

1.2.1. TECHNICAL SPECIFICATIONS

The government-provided technical guide specifications (UFGS available on the Advertised CD-ROM) shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for this facility.

The provided specification design guidance defines the minimum requirements and level of quality for items of equipment, materials, installation, and testing that shall be provided for the facility. Where items of equipment, materials, installation, or testing requirements are not covered in the provided specifications; special sections or within each guide specification or new specifications sections shall be prepared to cover those subjects. See Section 01332: SUBMITTALS DURING DESIGN for editing requirements.

1.2.2. APPLICABLE CODES AND STANDARDS

Refer to Section 01001 SUMMARY OF WORK for applicable codes and standards.

1.3. DESIRED IMAGE AND ARCHITECTURAL COMPATIBILITY

The Proposer shall verify all existing conditions and dimensions during design and prior to construction.

The building shall fit the site and be compatible with the surrounding environment. Building facades and elevations shall be similar in appearance to the enclosed elevation drawings. Building materials shall be compatible with the appearance of the adjacent Operations Support Facility (OSF) except as identified herein.

The clerestory element consisting of supporting structure, metal wall panels, reinforced aluminum storefront system, radiused metal soffit panels, and standing seam metal roof and fascia as shown on the drawings that is continuous over the Clinic Lobby and the east/west entry Corridor is a bid option. The basic bid shall consist of primary steel roof structure, secondary sloped roof structure, columns, roof deck, and modified bitumen roofing assembly at the location of the clerestory bid option.

1.4. TYPE AND METHOD OF CONSTRUCTION

1.4.1. Facility Construction

Facility shall be designed as permanent construction. The definition of permanent construction per MIL-HDBK-1191: Buildings and facilities designed and constructed to serve a life expectancy of more than 25 years, should be energy efficient, and must have finishes, materials, and systems selected for low maintenance and low life-cycle cost.

Types and methods of construction limited to the criteria established herein and shall meet all governing codes. Construction shall be in substantial compliance with the requirements of the concept drawings contained herein.

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Wood construction shall not be permitted.

All concrete masonry units and/or concrete walls used in this building shall be developed on a standard masonry metric module. Metric standardization of masonry wall design shall be developed which result in as few cut blocks as possible. Masonry structural properties shall comply with requirements outlined in Section 01005 STRUCTURAL REQUIREMENTS.

Walls, windows, floors, and roofing systems shall be permanently constructed and attached to each other. All construction shall be done in a workman like manner, properly installed in accordance with manufacturer's recommendations and finished.

Construction methods, materials, systems, etc... shall be of a quality that requires little or no maintenance.

1.4.2. Exterior Walls and Finish Materials

Exterior walls and finish materials shall be selected on the basis of architectural compatibility and appearance in accordance with the design provided. The outside face of the exterior walls shall be composed of colored insulated metal wall panels that match the color, texture, flushness, and smoothness of the OSF and cultured stone veneer (basic bid). (Cut stone as indicated on the drawings is a bid option). The insulated metal wall panel skin shall be of a gage that will not show an "oil canning" effect. Exterior walls shall have a minimum RSI value of 2.52 (R-value of 14.28 - English, "U" Value of .07) based on aged insulation values for the entire exterior wall construction. The insulated metal panels, window and storefront glazing, and cultured stone veneer shall match those installed on the OSF as closely as practicable giving consideration to availability and cost. All walls shall require a minimum of 50 mm (2-inches) of rigid perimeter insulation on the inside of foundation walls extending down to the frost line. All areas where thermal bridging can occur shall be insulated to meet the RSI-value (R-value) requirements and the insulation and vapor retarder membranes shall be continuous.

1.4.3. Interior Wall Construction

All interior walls shall be permanent construction. Demountable partitions shall not be considered acceptable.

Gypsum wallboard shall not be less than 16 mm thick and shall be type "X" fire rated where required.

Steel studs shall be sized and have a gage according to the wall heights required. Manufacturer recommendations shall be consulted with regard to unbraced length. Steel studs to receive ceramic tile shall be as recommended by the Tile Council of America recommendations for gage and thickness. Minimum required depth of stud shall be nominally 100 mm for interior wall construction and nominally 150 mm for exterior wall construction. Minimum gauge of stud shall be .912 mm (20 gauge) for interior studs and 18 gauge for exterior studs.

Interior walls requiring security, sound, smoke, or fire ratings or other walls extending to the underside of the roof structure shall be designed and constructed in accordance with UL and approved tested systems. These walls

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shall also allow structural deflection of the roof structure above without compromising the integrity of the wall assembly.

1.4.4. Interior Finishes

Refer to Section 01004, INTERIOR DESIGN REQUIREMENTS.

1.4.5. Floors

All interior floors shall be concrete slabs. All finish floors shall be constructed at the same elevations.

Depressed concrete floor slabs with a mortar bed shall be used for all floors that will receive ceramic or quarry tile in accordance with Tile Council of America (TCA) methods. Recessed slabs shall also be provided at locations receiving and recessed floor mats at vestibules.

1.5. FUNCTIONAL REQUIREMENTS

1.5.1. Equipment and Furnishings

1.5.1.1. Contractor Furnished and Contractor Installed Equipment

Contractor Furnished and Contractor Installed equipment and specialties within this facility shall comply with requirements of the Design Requirements Diagrams contained in Attachment 2 of this RFP. MIL-STD-1691 will govern the requirements for specific equipment items, logistical responsibility, and utility support requirements. In addition, the facility shall include but not be limited to the following items:

Handrails and Guardrails
Door Hardware and Miscellaneous Items
Toilet Accessories
Shower Curtain and Rods
Electric Water Coolers
Recessed Entrance Floor Mats
Toilet Fixtures and Accessories
Toilet Partitions
Fire Extinguishers and Cabinets
Miscellaneous Shelving (Janitor's Closets, storage rooms)
Mop Sink, Mop Shelf and Mop Holders
Key Storage Cabinet
Emergency Eye Washes and Showers
Dry Marker Boards in Conference/Training
Building Signage and Number
Interior Building Signage
All Casework, Base Cabinets, Wall Cabinets, Countertops, Sinks, and Hardware with undercounter storage for equipment, shelving, storage cabinets, and drawers. (Not specifically medical/dental casework)
Reception Casework
Personnel Doors and Hardware
Security Doors and Hardware
Accordion Partition in Conference/Training Room (STC 45)
Coiling Counter and Security Shutters
Information Board at Main Lobby
Corner Guards, Bumper Guards, and Wall Protection

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1.5.2. Occupational Safety and Health

Building design shall comply with OSHA Occupational Safety and Health Standards criteria for all items that must be included in the design to ensure safety compliance.

1.5.3. Handicapped Accessibility

The facility shall be in compliance with the requirements of the Uniform Federal Accessibility Standards (UFAS) and Americans with Disabilities Act (ADA). In situations where conflicts exist between UFAS and ADA requirements, the more stringent requirement shall govern.

1.5.4. Sound and Vibration Control

Exterior walls and interior partitions, ceilings, and roofs, materials shall be selected to impede transmission of the human voice and equipment vibrations. Noise generating equipment and activity centers shall be isolated through conventional methods where possible. Utilization of equipment isolators, construction of full height walls, stud staggering, and alignment of thru-wall receptacles, installation of sound absorption materials and other techniques shall be used throughout the facility to reduce noise transmission. Comply with requirements of MIL-HDBK-1191 for sound transmission (STC) of partitions.

1.5.5. Economy of Building Construction, Operation, and Maintenance: Life-Cycle Cost Effectiveness

1.5.5.1. Economy

All materials shall be readily available within the local area, as shall sufficient trades to construct the building.

No special or unique forms of construction shall be used and skilled workers within the area shall be familiar with the proper methods required to build this facility.

1.5.5.2. Operations and Maintenance

Material selections shall be based upon reducing operation and maintenance costs. All materials shall be easy to clean and resist soiling.

1.6. TECHNICAL REQUIREMENTS

1.6.1 Miscellaneous Metals

Information regarding miscellaneous metals shall be referenced to the UFGS Guide Specifications SECTION 05500, MISCELLANEOUS METALS for design criteria and minimum quality requirements.

1.6.1.1. Miscellaneous

Detailing and construction of louvers, motorized dampers, and ductwork shall be coordinated.

1.6.1.2. Access Doors and Panels

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Access doors and panels shall be flush type. Frames for access doors shall be fabricated of not lighter than 16 gauge steel with welded joints and finished with anchorage for securing into construction. Access doors shall be a minimum of 350 mm by 500 mm and of not lighter than 14 gauge steel, with stiffened edges, complete with attachments. Access doors shall be hinged to frame and provided with a flush face and a keyed operated latch. Exposed metal surfaces shall have a shop applied prime coat. Finished paint coat shall match surrounding surfaces. Panel shall be installed in uninhabitable rooms (i.e., closets) and/or non-conspicuous locations.

1.6.1.3. Finish Carpentry

Information regarding finish carpentry shall be referenced to the Corps of Engineer Guide Specifications SECTION 06200, FINISH CARPENTRY for design criteria and minimum quality requirements.

A. Fire retardant treated lumber shall not be used in this facility except at electrical and communication panel board locations.

B. All interior wood molding, shall be of the red oak species, Grade 1 in accordance with the grading rules per AWI. All interior wood trim items shall be stained and finished to coordinate with interior color scheme.

C. Wood chair rails shall be molded solid oak, sanded smooth, and a minimum 64 mm (2 1/2 inch) in height. Wood chair rail shall be a decorative molding with several curvature moldings. Chair rail trim shall be installed at 760 mm (30 inches) above the finished floor. Final mounting height and dimensions shall be coordinated.

D. Wood molding and other interior wood trim pieces shall be solid oak, sanded smooth and finished to match the wood doors and other trim.

E. Shelving shall be provided as indicated in Section 01004.

F. Clothing rods shall be an aluminum pipe or tubing 25 mm (1 inch) in diameter.

G. Window Stools shall be a solid surfacing material and shall be provided at each exterior window location. Material and decorative edge treatment characteristics shall match solid surface countertops. Window stool shall have a minimum 25mm (one inch) overhang at the wall/stool location.

1.6.2. Exterior walls

Metal wall panels shall match the OSF Facility located east of this building site.

Exposed finish for the exterior panels shall comply with NAANM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

Fluoropolymer 2-coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight.

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Stone panels adjacent to the main entrance area shall consist of cultured stone panels that will match the existing OSF facility in appearance of stone and textures for the stone including cultured stone accent banding.

1.6.3. Canopy at Main Entrance

A canopy shall be located at the main entrance of the building. This canopy shall be formed of metal steel framing encased with metal panels and standing seam metal roofing and as indicated.

1.6.4. Roof Insulation

Roofing insulation shall be rigid board type. A minimum aged RSI-value of 5.88 (R-Value 33.33 - English, U-factor value of .03) is required.

A single ply vapor retarder membrane shall be installed between the roofing deck and the bottom of the roofing insulation. The thickness of the vapor retarder membrane shall be in accordance with the roofing system standard thickness.

1.6.5. Roof Design

1.6.5.1. Built-up Roofing System (Modified Bitumen)

This facility shall consist of a built-up type of roof with an aggregate-surfaced cap sheet (modified bitumen). The critical aspects of the roofing system shall be appearance, and minimal maintenance.

Roof slopes shall be a minimum of 13 mm per 312 mm.

Primary roof slope shall be accomplished by sloping of the structural roof framing members to an interior roof type of drainage system that will be connected to the storm sewer system. The secondary roof slopes and the segment of roof over the entry vestibule and public toilets (see roof plan) with a flat structure shall be accomplished by the use of tapered insulation to interior roof drains connected into the storm sewer system.

Roof system shall provide a 20-year minimum warranty.

Roof system shall include a vapor retarder membrane.

Lightning protection shall be fully integrated and coordinated with the roofing detailing, and installation to not jeopardize in any way the roof warranty.

Roof drains and overflow drains shall be interior type drainage system that will be connected into the storm sewer system. Overflow drains shall be a complete separate system from the roof drain system.

1.6.5.2. Standing Seam Metal Roofing

Standing Metal roofing shall be designed at locations indicated on the drawings.

Roof System shall provide a 20-year minimum warranty.

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Roofing panels shall be free to move in response without damage to expansion and contraction forces resulting from a total temperature range of 122 degrees C (220 degrees F).

External reinforcement to improve uplift resistance, such as clamps on the ribs, and/or bolts through the seams is not considered acceptable.

The roofing panel finish shall be a factory applied fluoropolymer topcoat over a factory applied prime coat.

A continuous 60 mil ice and moisture water barrier membrane shall be installed at all roof eave, ridge and valley conditions. The membrane shall extend a minimum of 900 mm (36 inches) up from the eave roof edge and on either side of the ridge and valley center line.

1.6.6. Sheet Metalwork, General

Contractor shall include a quality assurance plan which includes a checklist of points to be observed, prior to start of roofing work.

All interior cavity thru-wall flashing shall be a metal type.

Fascia shall have "V" crimps and a stable substrate as required to prevent "oil-canning" effect and shall have a factory applied finish.

Metal soffit panels shall have a factory applied finish.

All louvers shall be designed and constructed with bird screens. Louver design shall be "stormproof" such as to prevent wind blown snow and rain from entering the building.

1.6.7. Doors

a. Except at entrance doors set with aluminum window wall framing, exterior doors shall be heavy duty flush steel type of doors minimum of 16 gauge face sheets with 16 gauge pressed steel frames, shall be weather tight, and insulated to meet an RSI-value of 1.76 (R-value of 10 - English). Steel door frames shall have a thermal break to prevent temperature transferring. These doors shall be complete door and frame assemblies with weatherstripping, door bottoms, and threshold.

b. All exterior doors open on to a structural concrete stoop and shall conform to NFPA #101 for floor slope at the door.

c. Doors in fire rated walls shall be fire rated according to the fire rating requirements of the walls in which they occur. All fire doors shall be in accordance with the requirements of NFPA #101.

d. Main entrance doors shall be compatible with and incorporated into the store front window wall system as detailed on the elevations. Entrance doors at these locations shall be manufacturer's standard, extra-heavy duty wide stile aluminum entrance doors with insulating glass and thermally broken frames.

e. Interior doors shall be constructed of solid core wood consisting of 5 or 7 ply construction with premium grade, book matched red oak veneer with oak edges set in pressed steel door frames.

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f. Metal rolling counter doors for Pharmacy and Records Storage shall be security counter type with frame, guides, and hood shall be fabricated of stainless steel. Door slats shall be a minimum of 0.85 mm (22 gauge) thickness. Curtain door shall have a locking capability on the inside of the room door side. Doors shall include an integral stainless steel counter. Door shall be manually operated.

1.6.8. Aluminum Storefront

Storefront manufacturer shall be a national brand company, which specializes in the design and manufacturing of the type of aluminum storefront indicated. Storefront construction shall consist of heavy duty extruded aluminum framing that provides a continuous thermal break. These windows shall include insulated glazing units. All exterior storefront and window units shall be installed and anchored in a manner that prevents the window and glass assembly from dislodging from the wall construction under the subjected design loads and as required to meet the force protection. Storefront configuration shall be substantially as indicated on the concept drawings.

1.6.8.1. Pressed Steel Windows (Interior)

Windows located in the interior corridors of the facility shall be constructed of pressed steel frames. These windows shall include tempered or laminated glazing as specified in UFGS Section 08810 GLASS & GLAZING. Window frames shall be painted to match the door frames.

1.6.9. Hardware; Builder's (General Purpose)

General: Comply with recommendations of Builder's Hardware Manufacturers Association (BHMA) and the Air Force Hardware Primer for hardware requirements except as otherwise indicated.

1.6.9.1. Hinges

All hinges shall be Grade I with a minimum of 3 hinges per door for a single type door. Excessively heavy (sound doors) or tall doors shall have additional or special hinges provided as recommended by the door manufacturer. Hinges shall be fully recessed and fit flush within designated frame slots.

1.6.9.2. Locks and Latchsets

All exterior and interior door locks and latchsets shall be series 1000 mortised type.

1.6.9.3. Lock Cylinders

Lock cylinders shall be "Best" compatible.

Lock cylinders shall not be less than seven pins.

Cylinder shall have key removable type cores. Disassembly of knobs, lever and locksets shall not be required to remove core from lockset.

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Provide a minimum of 5 spare cores, 2 blank master key sets and 10 blank keys.

1.6.9.4. Lock Trim

The doors of these facilities shall have lever handles with all exterior doors having panic type hardware where required by code.

1.6.10. Keying

Locks and special key hardware shall be keyed to the Schriever Air Force Base master key system or equal compatible lock system with interchangeable cores. The contractor shall provide construction cores at exterior locations. Keys will be cut and installed by the base. Provide a minimum of 2 blank keys per core. Cores shall be provided to match the base keying system and shall be a minimum of seven pin type.

A grand master keying system shall be provided for the building. All of the keys shall be keyed in one series, except the mechanical, electrical and communication equipment rooms. Locks for all mechanical, electrical, and communications equipment rooms shall be keyed to the existing Base utility keying system.

1.6.11. Door Closing Devices

Surface type overhead door closures shall be Grade 1, Series CO2000 Standard Cover. Closures shall be size VI.

1.6.12. Auxiliary Hardware

Door floor stop and holder shall be Type L01371.

Door wall stops shall be Type L02251.

Lever extension flush bolts shall be type L04081.

Metal thresholds shall be Type J16130.

All exterior doors shall have aluminum housed type weather seals.

All rated doors shall have compression type seal gasketing.

Door protection plates including armor, kick, and mop plates shall be provided for all doors subject to cart traffic, pedestrian, and other impacts.□

1.6.13. Finishes

Door hardware finish shall match satin stainless steel Type 630.

1.6.14. Door Hardware

1.6.14.1. Hardware Requirements

Door hardware in fire rated walls shall comply with NFPA and other applicable criteria.

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1.6.14.2. Hardware Sets

Develop and submit detailed hardware sets for each door type. Provide all required builder's hardware and associated miscellaneous hardware, thresholds, and weatherstrip. As a minimum, provide the following:

a. Exterior Doors, General

(1) All single exterior personnel doors shall have the following hardware features:

- Grade 1 hinges - Stainless Steel
- Exit Device type 3, Mortise Device
- Overhead closer
- Wall or Floor stops
- Weatherstripping
- Threshold
- Door Protection Plates as required

(2) All double exterior personnel doors shall have the following hardware features:

- Grade 1 hinges - Stainless Steel
- Surface vertical rod exit devices
- Overhead closer (Both leafs)
- Wall or Floor stops
- Weatherstripping
- Threshold
- Door Protection Plates as required

(3) All double exterior mechanical room, electrical room doors shall have the following hardware features:

- Grade 1 hinges
- Mortise lockset hardware (key locking capabilities on active leaf)
- Overhead closer (active leaf)
- Lever extension flush bolts (inactive leaf)
- Weatherstripping
- Rain drips
- Thresholds

b. Interior Doors

All single doors used in offices, janitor's closets, storage rooms, shall have the following hardware features:

- Grade 1 hinges
- Mortise lockset hardware (key locking capabilities - avoid self locking hardware.)
- Overhead closer
- Wall stops (with holder where appropriate)
- Door Protection Plates as required

In addition to the above, door(s) to the Pharmacy shall be provided with pushbutton cypher locks for security.

1.6.15. Key Storage System

A recessed wall mounted key cabinet shall be provided in the Control counter area, and contain all additional keys for all areas of this building. Cabinet shall have the capacity to store a minimum of two keys for each room on an individual key hook. Key hooks shall be mounted on panels with sufficient distance between hooks that will allow easy identification and removal. Cabinet key panels shall be readily removable and capable to insert additional panels for expansion needs. Key cabinet shall have key locking capabilities. Cabinet door shall be a full height piano hinge.

1.6.16. Glass and Glazing

1.6.16.1. Insulated Laminated Glass for Doors

Insulated laminated type glass for door applications shall be a minimum of 25 mm thick. Glass panel shall consist of two 6 mm glass panes separated by a 13 mm air space and hermetically sealed. Safety glass shall be used as required. All insulated glazing units shall be tinted with the coating applied to the number two surface.

1.6.16.2. Glass Mirrors

All glass mirrors shall be Type I transparent flat type, Class 1-clear and 6.4 mm thickness.

1.6.16.3. Laminated Glass

All exterior glass shall be insulating glass units, 25 mm total thickness, and tinted. Glass panel shall consist of two- 6 mm glass panes separated by a 13 mm air space and hermetically sealed. The inner lite of insulating glass units shall be 6 mm laminated glass, Class 1- clear, Condition A uncoated surface, Quality q3- glazing select. The outer lite of insulating glass units shall be Type I annealed glass, Class 1- clear, Quality q3- glazing select, low "E" and tinted. Laminate glass shall consist of two layers of Type I transparent heat strengthen glass bonded together with a PVB plastic inter layer. Tint shall match that of the OSF building. All exterior glass units shall be installed in a manner that prevents the window and glass assembly from dislodging from the wall construction and window frame under the subjected design loads.

1.6.17. Gypsum Wallboard and Steel Studs

Manufacturer shall have specialized in the manufacturing of these material products for a minimum of 10 years of documented experience.

Installer shall have a minimum of 5 years of documented experience.

All gypsum wallboard shall be a minimum of 16 mm thick (5/8 inches) thick and shall be type "X" fire rated where required for partitions where one-hour fire resistant construction is required or shown. All walls or partitions that are required to be fire rated, security, and/or sound rated shall extend to the underside of the roof deck above. All walls or partitions that do not extend to the underside of the roof or floor deck shall terminate not less than 150mm (6-inches) above the ceiling and be braced from the top of wall to structure above as required to meet minimum deflection requirements.

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Wall terminating at the underside of decks and walls that are braced overhead shall accommodate deflection in the structure above.

All steel studs shall be placed at a maximum distance 400 mm on-center. All interior non-load bearing studs shall comply with ASTM C 645 and ASTM C 754, designed with a minimum 10 psf and a deflection of L/240.

Predecorated gypsum wallboard is not acceptable.

Exterior gypsum wallboard soffit is not acceptable.

Water-resistant gypsum backing board used as a substrate to receive ceramic tile is not acceptable. Use cementitious backer board.

1.6.18. Tile

Floor tile in toilets shall be installed in accordance with Tile Council of America (TCA) method F121. Floor tile in showers shall be installed in accordance with Tile Council of America (TCA) method B415.

Wall tile shall be installed in accordance with Tile Council of America (TCA) method W244.

1.6.19. Ceilings

1.6.19.1. Acoustical Tile Ceiling

Acoustical ceiling system shall be a 600 mm x 600 mm exposed grid type. Acoustical panels shall have a square edge and recessed where the exposed grid system supports the panels. Characteristics of the acoustical panels shall consist of: textured surface, high density material to resist impact damage, non perforated tile with a textured finish.

1.6.20. Painting, General

1.6.20.1. Surfaces to Receive Stain or Paint

A semi-gloss enamel paint shall be on all exposed wall surfaces, except mechanical, electrical and communication rooms. A high-gloss enamel paint shall be used on all janitor closets walls. Gypsum wallboard walls receiving a semi-gloss or high-gloss finish shall have a gypsum wallboard finish of 5, in accordance with GA-214-96, Recommended Levels of Drywall Finishing.

Exposed masonry walls to be painted shall receive a latex filler coat prior to paint application.

Steel roof deck where exposed to view, structural elements, handrails and balusters shall receive a semi-gloss paint finish.

1.6.20.2. Surfaces Not to be Painted

Surfaces in the following areas are not to be painted:

Concrete or concrete masonry units in unexposed areas.

Concrete floors - except where noted.

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Metal surfaces of aluminum, stainless steel, chromium plate, bronze, copper and similar finish materials.

Jacketing over pipe insulation in unexposed locations that do not require color coding.

Surfaces of hardware, fittings, sprinkler heads, fire protection equipment and other factory finished items not requiring a painted finish.

Glass, wall covering and other finish surfaces.

1.6.21. Exterior Signage

Building number signage shall be cast aluminum material in a helvetica medium style, located on the south (entrance) facade of the building. Building number signage shall be 200 mm tall, satin-finished brushed aluminum, and mounted 1,500 mm above the finish floor.

1.6.22. Toilet Accessories

1.6.22.1. Accessory Types

Information regarding toilet accessories shall be referenced to the UFGS Guide Specifications, SECTION 10800, TOILET ACCESSORIES for design criteria and minimum quality requirements.

Provide an 18-gauge stainless steel, satin finish shelf integral 4 mop holder and 5 hook brackets at Janitors Closet.

Paper Towel Dispenser/Waste Receptacle (PTDWR) shall be a recessed unit supplying multi-fold paper towels. The cabinet shall have a concealed tumbler key lock. Unit shall have a 37.85 L minimum removable molded plastic insert. Provide at each lavatory.

Soap Dispenser (SD) shall be the liquid type pump type with a minimum 34 fluid ounce capacity. Provide at each lavatory.

Mirror Glass (MG) mirrors shall be a minimum of 400 mm wide by 600 mm deep and shall be installed over each lavatory. Provisions shall be made for mirrors to accommodate the physically handicapped by the use of tilt mirrors (MT) or other methods.

Toilet Tissue Dispenser (TTD) shall be a double roll dispenser with a recessed holder. Provide one for each WC.

Sanitary Napkin Disposer (SND) unit shall be wall or toilet partition mounted. Provide one at each WC designated as female or unisex.

Soap Holder (SH) shall be tile and integral with shower tile.

Robe Hook (RH) shall be a double hook with a 100 mm (4 inches) wide stainless steel bar mounted horizontally that forms a hook at each end. Flange approximately size is 50 mm x 50 mm. Unit extends approximately 50 mm from the wall.

Shower Rod & Curtain- shower curtain rod (SCR) shall be Type 304 stainless steel straight rod. Shower curtain (SC) shall conform to CID A-A-2398.

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Toilet partitions shall be floor mounted with overhead bracing. See Section 01004 for additional requirements.

1.6.22.2. Toilet Accessory Finishes

Finishes shall be stainless steel, Type 304.

1.6.23. Fire Extinguishers and Fire Extinguisher Cabinets

Fire extinguisher cabinets shall be sized to accommodate a 4.6 KG (10-pound) fire extinguisher cabinet and shall be fully recessed type with a flat metal door. Clear plastic bubble type door fronts are acceptable. Fire extinguisher cabinets shall be located in accordance with NFPA Life Safety Code #101. Color of the cabinets shall match that of the wall or trim. The larger fire extinguisher cabinets shall allow for larger future fire extinguishers.

Furnish additionally a 4.6 KG (10-pound) fire extinguishers (type meeting the code and hazard requirements of the space) sized to fit into the fire extinguisher cabinets selected.

1.6.24. Floor Mat and Frame

Entire floor mat and frame shall be fully recessed and flush with adjacent surfaces. The frame shall be constructed of aluminum extrusions and secured to the floor. The mat shall consist of carpet inserts with continuous interlocking treads which allows for easy roll-up.

1.6.25. Marker Boards

Marker board size shall be 1800 mm x 1200 mm. Marker board writing surface shall be composed of porcelain enamel fused to nominal 0.378mm (28 gage) thick steel. A 50mm (2-inch) oak perimeter frame shall be provided.

1.6.26 Cabinet & Countertops

All cabinet construction shall be commercial grade architectural woodwork, base and wall cabinets, and countertops. Plastic laminate and solid surface countertops shall be provided as indicated in Section 01004.

Cabinets shall be standard, factory-manufactured products of cabinet suppliers or custom-built. Cabinet construction shall be framed type cabinets. Top and bottom shall be braced with either hardwood blocks that are glued together with water-resistant glue and nailed in place, or metal or plastic braces. All cabinets shall be constructed of solid wood and/or five-ply plywood. The cabinet construction frame and doors shall meet minimum requirements set forth in ANSI/KCMA A161.1 for "high use" areas. Requirements for this organization may be found at www.kcma.org. The countertop shall be constructed of a minimum 3/4" particle board and covered with a high pressure plastic laminate or solid surface material.

All points of hardware attachments (e.g. screws, hinges) must be inserted into solid wood lumber. All exposed surfaces of the cabinets, doors and sides shall be finished with a plastic laminate material.

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The finish of interior cabinet, shelving and door surfaces shall be finished with a melamine material. Doors- shall be finished with a plastic laminate approximately 12.5 mm (1/2-inch).

Drawers- shall have side guides with an automatic stop feature. Sides and bottoms shall be constructed of hardwood, minimum 9 mm (3/8 inch) particle board, and/or plywood.

Drawer fronts should be removable and replaceable. All drawer joints must be dove-tailed.

Solid Surface Countertop where occurring shall consist of solid polymer material composed of acrylic polymer, mineral fillers, and pigments. Countertops shall have a semi-gloss finish. Countertop material shall have a minimum 13 mm (1/2 inch) thickness and be continuously supported with particle board. Countertop material of 19 mm (3/4 inch) thickness shall not require continuous supported particle board material. Sinks shall have an under mount installation and all exposed countertop edges shall have a decorative grooved edge treatment. Backsplashes shall be a 6 mm (1/4 inch) thick solid surface material which matches the countertops.

Solid Surface Material Characteristics: color and pattern continuous all through the material, material shall not delaminate with age, installation joints shall be seamless in appearance, shall not be porous and resist stains, shall resist fractures, chipping and cracking, have the ability to remove minor cuts and scratches with fine sand paper and restore it to the original condition, Class I flammability rating, vanity tops and bowls shall be fabricated in one unit (when possible), sinks with exposed lips and grout joints is considered unacceptable.

Cabinet hardware finishes shall match stainless steel, Type 304.

Door hardware shall be as follows:

door pulls- shall be similar to BHMA D1791, door hinges- a minimum of two concealed hinges with each door (similar to BHMA B01501),
door latch- a magnetic door catch, similar to BHMA B03141 for each door, □
mirrors- shall extend for top of backsplash to 2100 mm AFF (7 ft.).

2. PART 2 NOT USED

3. PART 3 NOT USED

-- End of Section --

SECTION 01004

INTERIOR DESIGN REQUIREMENTS

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SECTION 01004

INTERIOR DESIGN REQUIREMENTS

1. PART 1 INTERIOR DESIGN REQUIREMENTS

1.1. REFERENCES

The publications listed below shall be utilized for design of this facility to the extent referenced. Unless otherwise noted, the publications shall comply with the latest edition of the UFGS guide specification.

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC 134 Test Method: Electrostatic Propensity of
 Carpets

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1335 Tuft Bind of Pile Floor Coverings Room Method

ASTM E 84 Surface Burning Characteristics of Building
 Materials

ASTM E 648 Critical Radiant Flux of Floor-Covering
 Systems Using a Radiant Heat Energy Source

ASTM F 793 Standard Classification of Wallcovering by
 Durability Characteristics

ASTM F 1066 Vinyl Composition Floor Tile

ASTM F 1303 Sheet Vinyl Floor Covering with Backing

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A137.1 Ceramic Tile

CODE OF FEDERAL REGULATIONS (CFR)

16 CFR 1630 Standard for the Surface Flammability of
 Carpet and Rugs

36 CFR 1191 Americans with Disabilities Act (ADA
 Accessibility Guidelines for Buildings and
 Facilities

DEPARTMENT OF AIR FORCE (AF)

MIL-HDBK 1191 Air Force Facility Design and Planning Guide
 for Medical/Dental Clinic (includes Finish
 Materials Requirements)

AFPAM 32-1097 Air Force Sign Standards Pamphlet
 ([http://afpubs.hq.af.mil/pubs/majcom.asp?org=](http://afpubs.hq.af.mil/pubs/majcom.asp?org=AF)
 AF Click on Series 32)

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FEDERAL STANDARDS (FED-STD)

FED-STD 795 (Basic) Uniform Accessibility Standards

FEDERAL SPECIFICATIONS (FS)

FS AA-V-00200 Venetian Blinds

National Fire Protection Association (NFPA)

NFPA 101 Life Safety Code

1.2. DESIGN CRITERIA

The design is accomplished through requirements established in Sections 01336 and 01338 paragraphs INTERIOR DESIGN, defines the objective and tasks involved in all submittal criteria. The design of this building shall be in accordance with this document and shall comply with MIL-HDBK 1191 unless otherwise noted.

1.3. INTERIOR FINISHES

1.3.1. Carpet

Carpet shall be multi-colored for maximum soil-hiding properties and antistatic. It shall be 67% DuPont Antron Lumena and 33% DuPont Antron Legacy, 50 x 50 cm GlasBac tile, and Intersept Lifetime Antimicrobial. Carpet shall meet the following minimum requirements:

1.3.1.1. Pile Type

Pile type shall be loop with a minimum 1/8 gauge, minimum yarn weight of 28 ounces per square yard, and minimum pile density of 6.261.

1.3.1.2. Static Control

Static electricity build-up of the carpet shall be permanently less than 3.5 kilovolts at 21 degrees C and 20 percent relative humidity as determined by the American Association of Textile Chemists and Colorists (AATCC 134 Test Method), Electrostatic Propensity of Carpets.

1.3.1.3. Flammability and Critical Radiant Flux Requirements

Carpet shall comply with 16 CFR 1630 and have a minimum average critical radiant flux of .45 watts per square centimeter when tested in accordance with ASTM E 648.

1.3.1.4. Tuft Bind

Tuft bind force required to pull a tuft or loop free from carpet backing shall be a minimum 20 pound average force for loop pile when tested in accordance with ASTM D 1335. A ten-year warranty from the carpet manufacturer against edge ravel, delamination and tuft bind is required.

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1.3.1.5. Extra Material

Extra material from the same dye lot consisting of full width continuous broadloom shall be provided for future maintenance. A minimum of ten percent of the total square meters of each carpet, type, pattern, and color shall be provided.

1.3.1.6. Installation

Carpet shall be installed with a releasable adhesive. Adhesives and concrete primers shall be waterproof, nonflammable, meet local air-quality standards, and be as recommended by the carpet manufacturer.

1.3.2. Vinyl Composition Tile

Vinyl composition tile shall conform to ASTM F 1066, Class 2 (through pattern tile), Composition 1, asbestos-free. Tile shall be 3.2 mm thick and have the color and pattern uniformly distributed throughout the thickness of the tile. Tile proposed is Stonetex pattern and use of two colors in neutral range would ensure some interest in vinyl tile floors.

1.3.3. Sheet Vinyl

Sheet vinyl shall conform to ASTM F 1303, Type II, Grade 1 minimum wear layer thickness of 1.25 mm, and minimum overall wear layer thickness of 2 mm. Sheet vinyl shall have a 100 mm integral coved base. Sheet vinyl shall be installed as a monolithic material with all seams welded or bonded for a seamless installation, including integral coved base corners.

1.3.4. Ceramic Tile

Ceramic tile shall conform to ANSI A137.1, moderate to heavy grade only. Quarry tile shall be unglazed. Porcelain tile color shall extend uniformly through the body of the tile.

1.3.5. Interior Signage

Interior signage shall be included and requirements must be coordinated with the Contracting Officer. Locations that require signage are to include but not be limited to the following: restrooms, Pharmacy, X-ray, Blood Draw, Audio Booth, Pulmonary Test, Exam rooms, offices, lounge, file room, locker room, mechanical, electrical, utility, etc. These areas should be referenced to the floor plan and door schedule. Identification for each room is required as well as "way-finding." Directional signage is to be located along corridors with main building directory at the Clinic lobby. Signage shall comply with AFPAM 32-1097 and must conform to 36 CFR 1191 Americans with Disabilities Act (ADA) and FED-STD 795 Uniform Federal Accessibility Standards (UFAS), whichever is most stringent.

1.3.6. Resilient Base

Resilient base shall be 100 mm high and a minimum 3 mm thick. Coved base shall be installed with resilient flooring and straight base with carpet. Job formed corners shall be provided.

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1.3.7. Corner Guards

Corner guards shall be composed of an integrally colored high impact resistant resilient material mounted on a continuous aluminum retainer. Fire rating shall be Class 1 when tested in accordance with ASTM E 84, and have a maximum flame spread of 25 and a smoke development rating of 450 or less.

1.3.8. Wall Guard

Wall guards shall be provided with prefabricated end closure caps, extruded aluminum retainers, inside and outside corners, concealed splices, cushions, mounting hardware and other accessories standard with the manufacturer. Wall guard shall consist of snap-on covers of impact resistant resilient material, minimum 1.98 mm thick mounted over a minimum 1.57 mm thick retainer, anchored to the wall at maximum 600 mm on center. Wall guards to be installed from ceiling to base, one continuous unit.

1.3.9. Window Treatments

Window treatments shall include installation of Mecho Shade, or equal roller shades, in the 3000 Series. All windows are to receive roller shades with fascia panels and ball bearing opening adjustments.

1.3.10. Installation of Finishes

All finishes shall be installed as per manufacturer's recommendations. All necessary accessories and components shall be supplied and installed to provide complete and finished installations.

1.4. INTERIOR COLOR, TEXTURE, AND PATTERN

The design shall comply with MIL-HDBK 1191, unless otherwise noted, and shall be coordinated with the Contracting Officer and Medical/Dental Clinic Coordinator. The color, texture, and pattern selections for the building finishes shall provide an aesthetically pleasing, comfortable, easily maintainable and functional environment for the occupants. Interior finish colors and patterns shall be selected that will help hide soiling. Coordination of exterior and interior building colors and finishes is necessary for a cohesive design. The color legend to identify Interior Building Finishes is indicated in section 1.6 of this document.

1.4.1. Color

Color for this facility shall be guided by the Interior Building Finishes to provide a unified color design consistent with the design proposed.

Manufacturers and materials listed are not intended to limit the selection of equal colors from another manufacturer. Use placement of color to help define spaces within the facility. Color code different areas to help staff locate specific rooms within the facility. Color selections for items that are not identified shall be appropriate, and be compatible and coordinated with the specified colors.

The color scheme direction is to provide SID finishes in a cool yet neutral palette. Exposed wood is a mahogany tone and can be utilized through reception desks, interior doors, and furniture finishes. A family of green

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tones is provided for accent walls. Furniture upholstery should be green with terracotta accent. Care should be given to avoid any use of red in medical facilities.

1.4.2. Pattern

Provide pattern or variations in color to visually shorten long corridors and to provide visual interest. In addition, provide ceramic tile wall and floor patterns.

1.5. EXTERIOR FINISH COLORS

The exterior building finish material colors shall match the Operations Support Facility as follows:

Stone: Sandstone STN-1. Torrey Buff Stone; Color Buff, Finish Rock Face.
Sandstone STN-2. Torrey Buff Stone; Color Buff, Finish Machine Smooth.
Sandstone STN-3. Torrey Buff Stone; Color Buff, Finish Honed, Grout shall match stone color.
Granite- 1. Granicor; Peribonka Granite, Thermal Finish.

Mortar: Each mortar color shall match the adjacent stone.

Paint: Shall match Alucobond-Cooper Metallic.

Metal Wall Panels: Shall match Alucobond-Cooper Metallic.

Glass and Glazing: Vision Glass- Viracon; Bronze VE4-52.
Spandrel Glass- Viracon; Subdued Bronze SPD/V905 LF.

Aluminum Column Covers: Shall match Alucobond-Copper Metallic.

Standing Seam Metal Roofing: Shall match Alucobond-Copper Metallic.

All exterior finish materials and colors shall be coordinated with the approved Base standards. Submit actual building material samples to Contracting Officer for final approval.

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1.6. INTERIOR FINISH COLORS

FLOOR:

CPT-1	Interface Flooring Pattern: Caribbean Color: #3073 Nassau
VCT-1	Armstrong Industries Pattern: Stonetex Color: #52122 Pebble Gray
VCT-2	Armstrong Industries Pattern: Stonetex Color: #52147 Pumice Stone
SV-1	Armstrong Industries Pattern: Medintech Color: #86476-IXIA (Heat welded sheet vinyl flooring)
CT-1	Dal-Tile Color: #DK-114 Mottled Light Gray Size: 2" x 2"

BASE:

RB-1	Roppe Rubber Company Color: #P140 Fawn 4" High Rubber Cove Base
CT-2	Dal-Tile Color: #D-1456 Doe Size: 4" x 4"
IV-1	Armstrong Industries Pattern: Medintech Color: #86476-IXIA

WALLS:

PT-1	Devoe Raynolds Color: #2W15-2 Uptown Taupe
PT-2	Devoe Raynolds Color: #2C17-5 Elm Court
PT-3	Devoe Raynolds Color: #2C19-5 Iron Sides
PT-4	Devoe Raynolds Color: #2W16-4 Earth Stone

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CEILING:

ACT-1	Armstrong Ceilings Pattern: Cortega Item #769 Size: 2' x 2' lay-in
ACT-2	Armstrong Ceilings Pattern: Cirrus Item #561 Size: 2' x 2' tegular edge
PT-1	Devoe Raynolds Color: #2W15-2 Uptown Taupe

MISCELLANEOUS BUILDING FINISHES:

1. Hardware	Satin Stainless Steel
2. Wood Doors	Natural Medium Cherry Satin on Red Brick Veneer
3. Roller Shades	Mecho-Shade 5% Openness Color: Pewter Gray
4. Architectural Casework	Wilsonart Laminates A. Countertops: Color #4790-60 Greystone B. Vertical Surfaces: Color #D368-60 Taupetone
5. Toilet Partitions	Wilsonart Laminates Color: #4551-01 Blackstar Granite
6. Vanities	Corian Corp. Color: Mont Blanc Summit Series

COLOR BOARD PHOTOGRAPH:



1.7. INTERIOR FURNITURE PACKAGE

A Comprehensive Interior Design (CID) package shall be provided (Furniture and furnishings will be GF/GI). This includes items such as furniture, systems furniture, artwork, artificial plants and planters, draperies, etc. Furniture selections, finish and upholstery selections shall be coordinated with the Contracting/Purchasing Agent prior to starting the 60% submittal.

1.7.1. Selection and Procurement Methodology

The Contractor is required to provide and deliver a completed CID package (selection, design layout and plans for interior furnishings) to the User facility. Prior to the contractor's commencement of the 60% design, the Contracting/Purchasing Agent, with input and recommendation from the Interior Designer will choose a particular manufacturer for CID design. *Based on interim rule amending Defense Federal Acquisition Regulation Supplement (DFARS) Section 811, selection of furnishings on this project are to be determined after a market research has been conducted. The Contracting/Purchasing Agent, prior to making any selection of a manufacturer's product will make a determination based on conducted market research as to the price, quality and delivery time of UNICOR, Federal Prison Industries (FPI) products when compared with the private sector's products.*

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1.7.2. General Furnishings Description

a. Waiting Room Furniture:

Seating to be ganged wood arm, upholstered seat and back units. A space should be provided between seat and back to allow for cleaning. A moisture barrier on the seat will ensure durability. End tables to be wood ganged with seating and to have laminate tops.

b. Office Furniture:

Desks and modular units to be freestanding, not attached to the walls. Work surfaces to be laminate with painted metal base units. Hierarchy can be established through use of color; for example: mahogany laminate top with charcoal base in lead administrative areas/off-white laminate top with tone darker base for general office areas.

Chairs to be upholstered seat and back with task seating to be pneumatic lift, adjustable arm, 5-prong carpet castor base. Side chairs to be upholstered seat and back with wood frame.

File cabinets and bookcases to match in color and can be metal or wood as budget allows.

c. Exam Furniture:

Exam tables are as specified by medical personnel. Work areas are freestanding laminate work surfaces with minimal storage space required. A doctors stool is needed along with side chairs that can be vinyl or molded polypropylene in design.

2. PART 2 NOT USED

3. PART 3 NOT USED

-- End of Section --

SECTION 01005

STRUCTURAL REQUIREMENTS

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SECTION 01005

STRUCTURAL REQUIREMENTS

1. PART 1 STRUCTURAL

1.1. PROJECT DESCRIPTION AND REQUIREMENTS

The Medical/Dental Clinic shall be a single story structure with floor, roof, and exterior wall configurations as indicated on the attached architectural drawings. The building shall be structurally designed and configured by the Design/Build Contractor in accordance with the criteria and other requirements stated herein. The Contractor's Structural Engineer shall be responsible for the design of the complete structural building system. Structural design of the building shall be compatible with the architectural design. A complete structural system for the building shall include foundations, walls, roof framing, floor and/or roof diaphragms, lateral load stability, framing and connection of any architectural features, and support of mechanical and electrical equipment. The Contractor's Structural Engineer shall be responsible for insuring that all mechanical and electrical equipment and other auxiliary building features such as sprinkler piping, ductwork, piping, cabletrays, etc. are properly supported, and that all equipment and architectural features are adequately framed, reinforced, and connected. In addition, the Structural Engineer is responsible for the design of all lesser related structures such as utility vaults, pits, retaining walls, etc., although they may be shown on other disciplines' drawings.

1.2. DESIGN CRITERIA

The design publications listed below shall be used as sources of criteria for structural design. The criteria from these sources may be supplemented, but not supplanted, by applicable criteria contained in nationally recognized codes, standards, and specifications. (In all cases, later editions to the below listed documents may be used.)

Department of the Air Force Technical Manuals (AFM)

These manuals are available from the National Institute of Building Sciences Construction Criteria Base (CCB) on CD-ROM free of charge to the successful offeror. Some of these manuals may be available to download in Acrobat .pdf file format at the following internet address:

(<http://www.hnd.usace.army.mil/techinfo>.)

AFM 88-3 Chap. 3 Masonry Structural Design for Buildings (Oct 92)
(Army TM 5-809-3)

US Army Corps of Engineers Technical Instructions (TI)

(Some of these manuals may be available at <http://www.usace.army.mil/usace-docs> and listed under "Engineer Instructions".)

TI 809-01 Load Assumptions for Buildings (Aug 98)

TI 809-02 Structural Design Criteria for Buildings (Sep 99)

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- TI 809-04 Seismic Design for Buildings (Dec 98)
- TI 809-07 Design of Cold-Formed Load Bearing Steel Systems
 and Masonry/Steel Stud Walls (Nov 98)
- TI 809-26 Welding - Design Procedures and Inspections
- TI 809-29 Structural Considerations for Metal Roofing
- TM 5-853-1 Security Engineering Project Development
- TM 5-853-2 Security Engineering Concept Design
- TM 5-853-3 Security Engineering Final Design

American Society of Civil Engineers (ASCE) Publication

- ASCE 7-98 Minimum Design Loads for Buildings and Other Structures

American Concrete Institute Publications

- ACI 315 American Concrete Institute, Manual of Standard Practice
 for Detailing Reinforced Concrete Structures
- ACI 318-95 Building Code Requirements for Structural Concrete
 and Commentary
- ACI 530-92 Building Code Requirements for Masonry Structures and
 Commentary

American Institute of Steel Construction Publication

- Specification for Structural Steel Buildings - Allowable Stress Design,
 Plastic Design (ASD) (June 1, 1989)
- Load and Resistance Factor Design Specification for Structural Steel
 Buildings (LRFD) (December 1, 1993)
- Seismic Provisions for Structural Steel Buildings (April 15, 1998)

Federal Emergency Management Agency

The following publication concerning new buildings can be obtained at no charge from:

FEMA Report Distribution Center
PO Box 2012
Jessup, MD 20794
Telephone: 800-480-2520; Fax: 301-497-6378

FEMA-302 NEHRP Recommended Provisions for Seismic Regulations for New
Buildings and Other Structures, 1997 Edition. Part 1: Provisions (Feb 98)

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Steel Deck Institute (SDI) Publications

Diaphragm Design Manual (2nd Edition, 1987)

Design Manual for Composite Decks, Form Decks and Roof Decks and
Cellular Metal Floor Deck with Electrical Distribution (Pub No. 29)

Steel Joist Institute (SJI) Publications

Standard Specifications, Load Tables and Weight Tables for Steel
Joists & Joist Girders (1994)

Recommended Code of Standard Practice for Steel Joists and
Joist Girders

American Welding Society (AWS) Publications

AWS D1.1 American Welding Society, Structural Welding Code - Steel

AWS D1.3 American Welding Society, Structural Welding Code - Sheet
Steel

American Iron and Steel Institute (AISI) Publications

AISI Manual American Iron and Steel Institute, Cold-Formed Steel
Design Manual

1.3. STRUCTURAL LOADING CRITERIA

Structural loading criteria shall be developed using the criteria sources and following the procedures indicated below. Design loads and load combinations shall be in accordance with the requirements of ASCE 7-98, as a minimum, unless otherwise specified herein. The Medical/Dental Clinic shall be classified as a Category II facility for the purpose of calculating live, wind, and snow loads.

1.3.1 Roof Live Loads

1.3.1.1. Snow Load

Roof snow load, including additional loading due to snow drifting where appropriate, shall be calculated and applied in accordance with ASCE 7-98 using a ground snow load of 720 Pa.

1.3.1.2. Rain Loads

Rain loads shall be considered in accordance with ASCE 7-98.

1.3.1.3. Minimum Roof Live Load

A minimum roof live load of 1440 Pa applied in accordance with ASCE 7-98 shall be used as a loading condition for the roof independent of the calculated snow load.

1.3.2. Floor Live Loads

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Minimum uniformly distributed floor live loads shall be as listed below:

<u>AREA</u>	<u>LIVE LOAD (Pa)</u>
Mechanical/Electrical Rooms	7200
All Other Areas	4800

The floors shall be capable of supporting an 8.9 kN concentrated load applied over a 760 mm by 760 mm area positioned anywhere.

1.3.3. Wind Loads

Wind loads shall be calculated in accordance with the procedures outlined in ASCE 7-98 using Exposure "C" and a Basic Wind Speed (3-Second Gust Speed) of 40 meters per second. Wind loads for both the main wind-force resisting system and for components and cladding shall be considered.

1.3.4. Seismic Loads

The Medical/Dental Clinic shall be designed to withstand seismic loading in accordance with Army Corps of Engineers TI 809-04. Seismic Parameters for Schriever AFB are as follows:

S_s (Short Period Spectral Response Acceleration) = 0.175
 S_1 (1 Second Period Spectral Response Acceleration) = 0.055
Site Classification D.
Seismic Use Group I.
Seismic Design Category B.
Seismic Performance Objective 1A (life safety).

1.3.5. Dead Loads

Minimum design dead loads for common building materials shall be obtained from ASCE 7-98. Equipment loads and loads for materials not listed in that publication can be obtained from other recognized sources.

1.3.6. Lateral Partition Loads

The minimum design wind pressure on interior partitions shall be 240 Pa normal to the partition.

1.3.7. Deflections

1.3.7.1. Roofs

The deflection of structural members supporting roofs, due to dead load plus either live load, snow load, or wind load, shall not exceed 1/180 of the span; and due to only live load, snow load, or wind load, shall not exceed the following:

1/480 of the span where plaster or other brittle ceiling materials are attached or suspended.

1/240 of the span where gypsum wall board or other non-brittle ceiling materials are attached or suspended.

1.3.7.2. Lateral Drift

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Allowable story drift shall not exceed 0.0025 times the story height for wind loads with a 10-year mean recurrence interval. Allowable story drift for seismic loads shall be in accordance with Army Corps of Engineers TI 809-04.

1.3.7.3. Partitions

The deflection of interior partitions due to lateral pressures shall not exceed 1/240 of the span.

1.4. STRUCTURAL MATERIALS

Materials for structural elements shall be as indicated herein or on the attached architectural drawings. Where materials are not indicated, selection shall be at the Contractor's discretion, with the following limitations.

1.4.1. Structural Steel

1.4.1.1. Design

Structural steel shall be designed in accordance with AISC Specification for Structural Steel Buildings - ASD or LRFD. All structural steel members shall be designed by the structural engineer to support all applicable loads. Structural drawings shall clearly show all structural members, connections and their locations.

1.4.1.2. Connections

Types of connections shall be consistent with the design assumptions for the basic type of steel construction used. Connections shall be designed and detailed to provide adequate capacities for the applied forces and moments. Connection design shall be the responsibility of the structural engineer and shall not be delegated to the steel fabricator.

1.4.1.3. Embedded Steel

Steel embedded in concrete for such purposes as exterior railing, handrails, fence, base plates, anchor bolts, etc. shall be hot-dipped galvanized after assembly unless otherwise directed. The use of dissimilar materials for these purposes shall not be allowed.

1.4.1.4. Structural Steel Plant Certification

Structural steel shall be fabricated in an AISC certified Conventional Steel Building Structure (Category Sbd) fabrication plant.

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1.4.2. Steel Joists and Joist Girders

The design and selection of steel joists and joist girders shall be governed by the Steel Joist Institute (SJI) Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders. The net wind uplift requirements shall be clearly delineated on the drawings. Joists requiring special configurations or design to resist wind uplift and non-uniform loads shall be designated as such on the drawings and the required design loads indicated, per SJI recommendations. Joist end supports and anchorage to resist uplift shall be designed to accommodate the applied forces, including those resulting from wind and seismic activity.

1.4.3. Steel Decking

The design and selection of steel deck shall be in accordance with the provisions of the Steel Deck Institute (SDI) Design Manual. Minimum required section properties of deck sections shall be determined as prescribed by the appropriate Specifications of the SDI Design Manual, and shall be specified or indicated on the drawings. Where the steel deck is designed to function as a shear diaphragm, the design shall be in accordance with the provisions of the Steel Deck Institute (SDI) Diaphragm Design Manual and Army Corps of Engineers TI 809-04. If steel framing is used, a structural metal deck shall be provided under the nonstructural metal roof where it occurs. See TI 809-29 for guidance on the use of structural metal decks under architectural roof panels. Metal decks shall be fastened to structural framing members with adequate fasteners to resist all in-plane shear and perpendicular uplift loads.

1.4.4. Masonry

1.4.4.1. Design

Masonry design shall be in accordance with ACI 530-92, AFM 88-3 Chap. 3 and Army Corps of Engineers TI 809-04. Reinforcement shall be sufficient to satisfy the calculated requirements for strength, shrinkage crack control, and seismic design. In no case shall reinforcement be less than the minimum seismic reinforcement required by TI 809-04. If masonry walls are used in conjunction with steel framing as non-load-bearing and non-shear-resisting elements, the connections between walls and the structural steel frames must be designed to allow vertical and horizontal frame deflection without transferring loads from steel to adjoining masonry walls.

1.4.4.2. Masonry Material Properties

Specified compressive strength of masonry shall be $f'_m = 9.3$ MPa. Hollow concrete masonry units shall conform to ASTM C90, Type I. Concrete building bricks shall conform to ASTM C55, Type I. Type S mortar shall be specified for all masonry. Specified compressive strength of grout shall be 14 MPa minimum.

1.4.4.3. Crack Control

Concrete masonry crack control measures comprised of masonry control joints, joint reinforcement, and bond beams shall be incorporated in the design of concrete masonry walls and partitions. Masonry Control Joints (MCJ) shall be judiciously located at spacings no greater than the maximums recommended

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in AFM 88-3 Chap. 3 and shall be shown on the Architectural elevations.
Control joints shall not be placed closer than 600 mm to openings.

1.4.4.4. Masonry Quality Control

The provisions in Corps of Engineers Guide Specification 04200, Masonry, regarding Sample Masonry Panels and Special Inspection shall be retained and complied with.

1.4.5. Reinforced Concrete

1.4.5.1. Design

Reinforced concrete design shall be in accordance with ACI 318 and related current ACI publications which are applicable to the design, TI 809-02, and Army Corps of Engineers TI 809-04, as applicable. All concrete elements, including slabs-on-grade, shall be reinforced with temperature and shrinkage reinforcement as a minimum. Temperature reinforcement shall be as recommended by ACI and TI 809-02, as appropriate.

1.4.5.2. Concrete Strength

The required 28-day compressive strength of the concrete shall be left to the Contractor's discretion, except that 21 MPa shall be a minimum. For concrete that is to be installed with exterior exposure, air-entrainment, producing a total air content in the concrete between 4 and 7 percent by volume, shall be required. Concrete in contact with soil shall be made with the type of cement indicated in the Final Foundation Analysis.

1.4.5.3. Reinforcing Bar Usage Limitations

Grade 420 bars shall be used for concrete design. When available, grade 300 bars may be used for secondary reinforcement such as stirrups and ties. Minimum bar size shall be #13 bars except for stirrups and ties which may be #10 bars as per ACI.

1.4.5.4. Concrete Joints

Control joints and contraction joints shall be located to reduce concrete cracking to a minimum. All exposed concrete joints shall be sealed with appropriate joint sealants.

1.4.6. Precast Concrete

1.4.6.1. Design

The design shall conform with the requirements of ACI 318, Chapter 16 - Precast Concrete. The precast units shall be designed for all applicable loads indicated in paragraph STRUCTURAL LOADING CRITERIA and the design shall consider all loading and restraint conditions from initial fabrication to completion of the structure. Flexural members shall be designed to support full live load acting in combination with full dead load, plus concentrated loads from any mechanical equipment actually furnished. The effects of initial and long-time deflections as well as transporting the units shall be considered in the design of precast members. Attachment of precast units shall be by welding, bolting or embedment of bars or other connection devices, at the Contractor's option.

1.4.6.2. Precast Concrete Strengths

The required 28-day compressive strength of precast concrete shall be left to the Contractor's discretion, except that 35 MPa shall be a minimum. For any precast units that are to be installed with exterior exposure, air-entrained concrete, with a total air content between 4 and 7 percent by volume, shall be required.

1.4.7. Light Gage Cold-Formed Steel Framing

Cold-formed metal framing systems used for perimeter walls, fascias, soffits, and architectural framing shall be formed from steel that conforms to the requirements of ASTM A 653. All cold-formed steel framing, accessories, and connectors shall receive a G60 galvanized coating.

1.5. STRUCTURAL FRAMING SYSTEMS

The structural systems used for the Medical/Dental Clinic shall be selected and designed by the Contractor. The Basic Seismic-Force-Resisting System shall conform to one of the types indicated in Table 7-1 of TI 809-04 subject to the limitations on height based on the *Seismic Design Category* indicated in the table. The lateral load resisting system shall incorporate bracing, moment resisting frames, shear walls, diaphragms, or any combination thereof, provided the elements of the system are compatible with the attached architectural floor plan. Roof decks shall be designed and constructed as continuous diaphragms to transmit in-plane story shears to the vertical lateral load resisting members. Cold-formed light-gage metal framing (i.e., steel studs) systems shall be designed in accordance with TI 809-07. An erection plan shall be reviewed, signed, and sealed by a Structural Engineer licensed in the State of Colorado, and submitted for approval. A plan is required regardless of the selected framing system. The structural framing system chosen shall meet all aforementioned project requirements and the requirements listed below.

1.5.1. Roof Framing

The roof surfaces shall slope as indicated on the Architectural drawings. The roof slope may be accomplished by sloping of the structural framing members. The design of roof framing members shall include consideration of any concentrated loads from suspended mechanical and electrical equipment. The location and magnitude of suspended equipment loads shall be closely coordinated with the mechanical and electrical system designs. Special superimposed and suspended loads on the structural frame must be identified and accommodated in the structural design by the contractor. Loads must be considered and attachments must be detailed in the design drawings. Such loads may include, but are not limited to, suspended x-ray equipment, movable partitions, exam lights, expansion tanks, exhaust fans, or other mechanical equipment, and superimposed rooftop equipment.

1.5.2. Location of Structural Elements

Structural elements, including columns, bracing, shear walls and load-bearing walls shall be located as required by the structural design. The structural design and corresponding selection and location of structural elements shall be compatible with the floor plan, roof plan, elevations and other architectural drawings included in the attachments to this document. Columns shall be located in walls, and in such a manner that doorways or other access ways are not obstructed. The size and impact of pilasters and in-wall columns which protrude into the room spaces shall be minimized. Free standing isolated columns are not acceptable. Use of structural bracing shall be minimized, and shall be limited to locations where bracing is concealable at interior or exterior wall lines and does not obstruct windows, doors or other openings. Shear walls, where used, shall be located in coordination with architectural partition requirements.

1.5.3. Prohibited Systems

The following types of structural systems shall be prohibited in any part of the building main gravity or lateral force resisting system.

- Wood or timber: No plywood or other wood panel product shall be used for roof or wall sheathing.
- Light gage cold-formed steel loadbearing walls, light gage cold-formed steel floor/roof joists, or light gage cold-formed steel roof trusses.
- Metal building systems ("pre-engineered buildings").
- Structural deck material other than steel, concrete, or a combination of the two.

1.6. EXTERIOR/INTERIOR WALLS

Criteria indicated in Section 01003 ARCHITECTURAL REQUIREMENTS shall be incorporated into the design of all walls. The Architectural floor plans included in the attachments to this document indicate the location of walls to be incorporated into the project.

1.6.1. Non-Load-Bearing Walls

Non-load-bearing walls shall be laterally braced by the roof structure, and shall be connected in a manner which provides for vertical deflection of the roof structure without inducing vertical loads into the wall.

1.6.2. Shear Walls

Shear walls, where used, shall be constructed of cast-in-place or precast reinforced concrete, reinforced concrete masonry units, or cold formed steel panels with diagonal steel straps at the Contractor's choice. Shear walls shall be designed in accordance with ACI 318, ACI 530, AFM 88-3 Chap. 3, TI 809-07 and Army Corps of Engineers TI 809-04.

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1.7. FOUNDATION SYSTEMS

Design of foundation components shall be the responsibility of the contractor. The components of the foundation system shall be constructed of reinforced concrete. The required 28-day compressive strength of concrete for the foundations shall be left to the Contractor's discretion, except that 21 MPa shall be a minimum. All parts of the foundation system shall be designed to keep dead load footing pressures relatively uniform, in order to minimize differential settlements.

1.7.1. Earthwork

Earthwork for the Medical/Dental Clinic shall conform to the requirements set forth in Technical Specification 02315 EXCAVATION, FILLING AND BACKFILLING FOR BUILDINGS and to requirements stated in the attached Final Foundation Analysis.

1.7.2. Foundation Systems

The foundation system for the Medical/Dental Clinic shall consist of a combination of spread footings and continuous strip footings under columns, exterior walls, and any shear walls.

1.7.3. Design Parameters

Parameters used for foundation design, including the allowable soil bearing pressure, lateral earth pressure coefficients and design footing depths shall be in accordance with the attached Final Foundation Analysis report. The allowable soil bearing pressure represents the allowable soil stress at the base of footings in excess of that due to existing overburden. The weight of any fill added to the site above that required for frost protection shall be subtracted from the allowable soil bearing pressure to arrive at a net allowable pressure due to structural loads.

1.7.4. Foundation Perimeter Insulation

Perimeter insulation shall be installed on the interior face of all exterior perimeter foundation walls. Insulation shall extend from the bottom of the floor slab down to top of footing or down to design frost depth.

1.7.5. Structural Stoops at Exterior Doorways

All exterior pedestrian doorways require structural stoops. Stoops shall have foundation walls extending down to frost depth and shall be rigidly attached to building foundation walls. Stoops shall have a 300 mm layer of uncompacted fill placed directly beneath the stoop slab. The stoop slab shall be flush with the interior floor slab at the threshold and shall slope away from the building at 2% minimum slope.

1.8. CONCRETE FLOOR SLABS-ON-GRADE

Design of slabs shall be in accordance with TI 809-02 and the following detailed instructions:

1.8.1. General

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Slabs shall be designed as "floating slabs" without rigid edge support, and with lateral and vertical movement unrestrained, except where noted below. Where compressible filler is used as a cushion, its thickness shall be not less than 50 mm. An isolation joint, consisting of a 13 mm layer of expansion joint material, is required where slabs abut vertical surfaces. Slab thicknesses shall be selected in accordance with TI 809-02 or as required by design. Slabs shall be reinforced with a minimum of 0.15 percent steel based on cross sectional area. Crack control measures shall be incorporated in the slab design. Contraction joints shall be constructed by saw cutting or using tempered hardboard, PVC, or HIPS inserts. Control joint details and spacings shall be as delineated in TI 809-02. The required 28-day compressive strength of concrete for slabs shall be left to the Contractor's discretion, except that 21 MPa shall be a minimum. Minimum slab thickness shall be 150 mm at the mechanical room and 100 mm elsewhere.

1.8.2. Interior Concrete Slabs-on-Grade

Interior slabs-on-grade shall be placed over a 13mm layer of sand, on top of a layer of crushed stone material with not less than 150 mm compacted thickness. An 0.5 mm PVC or polypropylene vapor barrier shall be placed beneath the crushed stone. A non-woven polypropylene or polyester geotextile with a minimum mass of 271 grams per square meter shall be placed between the vapor barrier and the crushed stone to protect the vapor barrier. All slab crack control joints, construction joints, isolation joints between edges of slabs and vertical surfaces, and any mechanical, plumbing or electrical penetrations through the floor slab shall be sealed with a flowable polyurethane caulk.

1.8.2.1. Crushed Stone Layer

Crushed stone material shall consist of clean, crushed, nonporous rock, crushed gravel, or uncrushed gravel conforming to ASTM C 33 size designation 67. The crushed stone shall be placed in one lift, compacted by a hand operated, vibratory compactor.

1.8.3. Slabs to Receive Quarry Tile, Ceramic Tile or Floor Mat Finish

Slabs to receive finishes requiring an inset grout bed or frame shall be 125 mm uniform in thickness, and shall be reinforced with #13 bars at 300 mm o.c. each way. Slabs shall be depressed as necessary to receive the ceramic tile or the floor mat and frame. At interior edge locations, the slab shall be thickened and doweled into the adjacent slab with 19 mm diameter x 400 mm long dowels at 300 mm o.c. At locations where the slab abuts an exterior foundation wall, it shall be supported by the wall.

1.8.4. Concrete Floor Slab Finishes

Exterior ramps and loading docks shall be given a non-slip finish. A minimum of two coats of sealer/hardener shall be applied to all interior floor slabs that will be exposed to view. Slab finishes in other portions of the building shall be left to the discretion of the contractor, subject to the approval of the Contracting Officer. Slab elevations shall be adjusted so that all finish floor levels for all types of finishes are the same.

1.8.5. Floor Flatness

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Specified overall values of flatness, F(F) 35; and levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and levelness, F(L) 17.

1.8.6. Interior Equipment Pads

Floor mounted mechanical and electrical equipment shall be installed on 150 mm thick raised concrete housekeeping pads. The pads shall be reinforced with at least the minimum temperature reinforcement required. The pads shall be sized 150mm larger all around than the piece of equipment furnished and all edges of the pad shall be chamfered.

1.8.7. Equipment Vibration Isolation

All vibration producing mechanical and electrical equipment shall be mounted in such a manner as to prevent the transfer of vibrations to adjacent parts or areas of the building. If necessary for any large vibration producing equipment installed within the facility, the equipment will be supported on individual isolated foundations. The isolated foundation shall be separated from the building slab by a continuous 19mm expansion joint.

1.9. ALIGNMENT VARIATIONS

Variations from level, or from slopes specified for roof decks, floors, ceilings, beam soffits, lintels, sills, horizontal grooves, or other conspicuous lines shall be as follows. For overall length of line or surface of 3 meters or less, +/- 3 mm; up to 6 meters, +/- 6 mm; up to 12 meters, +/- 13 mm.

1.10. OTHER STRUCTURAL WORK

1.10.1. Standing Seam Metal Roof System

Standing seam metal roof shall comply with the requirements set forth in Technical Specification 07416 STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM. Final drawings will provide a list of loading criteria including roof live and wind uplift loads. A wind uplift diagram shall be used to identify wind uplift pressures and their locations on the roof.

1.10.2. Exterior Equipment Pads

Any exterior mechanical or electrical equipment shall be installed on concrete pads. The pads shall be a minimum of 200 mm thick and shall be reinforced with at least the minimum temperature reinforcement required. The pads shall be sized 300 mm larger all around than the piece of equipment furnished and all edges of the pad shall be chamfered. Design of exterior pads shall be coordinated with Mechanical and Electrical system designs.

1.10.3. Exterior Screen Walls

Exterior screen walls for the purpose of concealing equipment shall be constructed of cast-in-place concrete or concrete masonry unit. See architectural for finished masonry facing. Screen wall footings shall extend below frost depth.

1.11. FUTURE EXPANSION

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No provision for attachment of future structures above or adjacent to the current construction shall be included in the design. Any future additions must be structurally independent, with footings located so as not to bear over current footings. See drawing Sheet C-1 for possible future horizontal expansion direction (west).

2. PART 2 NOT USED

3. PART 3 NOT USED

-- End of Section --

SECTION 01006

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SECTION 01006

MECHANICAL REQUIREMENTS

1. PART 1 TECHNICAL REQUIREMENTS

1.1. MECHANICAL SYSTEMS CRITERIA

1.1.1. General Parameters/References

Mechanical systems, including HVAC systems, plumbing, gas distribution and building temperature controls shall be designed to comply with this section and the documents listed below to the extent referenced in this section. The publications are referred to in the text by basic designation only. The latest edition of the following standards and codes in effect and amended as of date of supplier's proposal, and any subsections thereof as applicable, shall govern design and selection of equipment and material supplied:

Air Force Manual (AFM) 8-4, Chapter 5 Gas Distribution.

Air Force Dental Facility Design Guidance (AFDFDG) by USAF Dental Investigation Service, June 1998.

American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE):

Guides; Terminology of HVAC&R, 2nd Edition etc.

Handbooks; Current Editions

Standards; Current Editions

American Society of Mechanical Engineers (ASME), 22 Law Drive, P.O. Box 2900, Fairfield, N.J. 07007-2900. (UFGS specifications reference applicable ASME standards.)

Army Technical Instructions TI 809-04 Seismic Design for Buildings, dated December 1998.

Army Technical Manual TM 5-785 Engineering Weather Data, dated July 1, 1978.

Army Technical Manual TM 5-805-4 Noise and Vibration Control, dated May 26, 1995.

Army Technical Manual TM 5-810-1 Mechanical Design Heating, Ventilating, and Air Conditioning, dated February 1, 1999.

Army Technical Manual TM 5-810-5 Plumbing, dated August 1, 1993.

Army Technical Manual TM 5-815-1 Air Pollution Control Systems for Boilers and Incinerators.

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Army Technical Instructions TI 810-11 Heating, Ventilating and Air Conditioning (HVAC) Control Systems, dated November 30, 1998.

Executive Order 13123, Greening the Government Through Efficient Energy Management, dated 3 June 1999.

Instrument Society of America Standard (ISA S75.01), Current Edition.

Military Handbook MIL-HDBK-1191, Department of Defense, Medical and Dental Treatment Facilities, Design and Construction Criteria, dated May 24, 1996.

National Fire Codes (NFPA), with most current updates.

National Standard Plumbing Code, National Association of Plumbing-Heating-Cooling Contractors, P.O. Box 6808, Falls Church, VA 22046.

Omaha District Design Guide, Mechanical

Safe Drinking Water Act of 1998.

SMACNA HVAC Duct Construction Standards - Metal and Flexible

Underwriters Laboratories (UL 142), (UL 441) Current edition.

1.2. GENERAL REQUIREMENTS

The mechanical design shall consist of heating, ventilating, and air-conditioning, gas distribution, HVAC controls and plumbing. Drawings, specifications, design analysis and calculations shall be provided for both the 60 percent design and Final design submittals, and shall be in accordance with SECTION 01336 - 60 PERCENT DESIGN REQUIREMENTS, & SECTION 01338 - 100 PERCENT DESIGN REQUIREMENTS.

a. This chapter contains instructions and engineering requirements for the mechanical design of the following:

- Equipment Identification and Abbreviations.
- Identification of Piping.
- Seismic Protection for Mechanical Piping and Equipment.
- Thermal Insulation of Mechanical Systems.
- Plumbing Systems.
- Exterior Gas Distribution Systems.
- Interior Gas Piping Systems.
- Hydronic Heating Systems.
- Heating, Ventilating, and Air-conditioning Systems.
- Refrigeration/Chilled Water Systems.
- Building Temperature Control Systems.
- Testing, Adjusting, and Balancing of HVAC Systems.
- Technical Specifications.
- Design Energy Target (DET) Compliance Check.
- Training.
- Testing.
- Commissioning of HVAC.
- Plumbing Fixture Schedule.

b. Provide new mechanical systems, complete and ready for operation. The design and installation of all mechanical systems, including manufacturer's products, shall meet the instructions and requirements contained herein and the requirements of the provided technical guide specifications. Where conflicts between these instructions and the guide specifications or criteria exist, these instructions shall take precedence. Any installation requirements within these instructions, but not contained in the specifications, shall be added to the specifications or shown on the drawings. For minimum specification requirements see paragraph TECHNICAL SPECIFICATIONS.

c. Mechanical designs shall give maximum consideration to the comfort of the occupants. The design shall also be economical, maintainable, energy conservative and shall take into account the functional requirements and planned life of the facility. Mechanical designs shall also consider life cycle operability, maintenance and repair of the facility and real property installed equipment components and systems. Ease of access to components and systems in accordance with industry standards and safe working practices is a design requirement. All like equipment and accessories shall be from a single manufacturer.

d. Standard Products - Material and equipment shall be a standard product of a manufacturer regularly engaged in the manufacture of the product and shall be essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. The label or listing of the Underwriters Laboratories, Inc., will be accepted as evidence that the materials or equipment conform to the applicable standards of that agency. In lieu of this label or listing, a statement from a nationally recognized, adequately equipped testing agency indicating that the items have been tested in accordance with required procedures and that the materials and equipment comply with all contract requirements will be accepted.

e. Calculations shall be provided for all mechanical equipment such as boilers, heating and cooling coils, air-cooled chiller, unit heaters, piping, pumps, expansion tanks, fans, ducts, louvers, gas services and piping, plumbing, water heaters, and etc. Heating and cooling calculations may be provided by computer analysis, i.e., Trane/Trace, "BLAST" and/or a Department of Energy (DOE) Program. The Design Build Contractor shall seek prior approval for use of any other load design programs. The load program shall determine the design-cooling load, heating load, total air quantity, and supply air drybulb temperature. The internal loads to be considered shall include people, lighting, and equipment. The outside air amount and air change per hour shall be as listed in Military Handbook 1191. The HVAC systems installed shall be designed in accordance with, but are not limited to the listed code and criteria references as shown in paragraph 1.1.1. Add piping losses allowance of 15 percent and safety allowance of 12 percent. Design Energy Usage shall meet or be below Design Energy Target (see paragraph DESIGN ENERGY USAGE (DEU) COMPLIANCE CHECK).

f. An acoustical analysis shall be performed to ensure that the selected supply and return fan generated duct borne noise is attenuated as necessary to satisfy room STC values in accordance with MIL-HDBK-1191. Provide sound attenuators as required or modify duct arrangement to reduce sound levels in occupied spaces.

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1.2.1. Facility Descriptions

The facility is a Medical/Dental Clinic to provide routine healthcare services for Schriever's active duty population.

a. The facility shall be occupied (12) hours per day, (5) days per week. Mechanical rooms, vestibules, janitor's closets, and storage shall be assumed as unoccupied. All other spaces are occupied.

1.2.2. Design Conditions

The following conditions shall be used in designing the mechanical systems:

a. Site Elevation:

Equipment design elevation is 1873 meters above sea level. Appropriate corrections shall be made when calculating the capacity of all mechanical equipment installed at this elevation.

b. Latitude: 38 Deg. N

c. Heating Degree Days: 6,473

d. Cooling Degree Days: 461

e. Outside Design Conditions:

Winter: -16.7°C.

Summer: 31°C.

f. Inside Design Conditions:

Winter: See MIL-HDBK-1191, Appendix A.

Summer: See MIL-HDBK-1191, Appendix A.

g. Minimum Ventilation Requirements:

See MIL-HDBK-1191, Appendix A.

h. Cooling Loads:

Lighting - Coordinate with Electrical Design Engineer (see Section 01007 ELECTRICAL REQUIREMENTS).

Communication Equipment Rooms - Coordinate with Communications Design Engineer (see Section 01007 ELECTRICAL REQUIREMENTS)(communications equipment shall be assumed 100% resistive heating).

PC/monitor/printer - 840 watts total per station.

People - 75 Watts/person sensible and 60 Watts/person latent; moderately active office work per ASHRAE Handbook of Fundamentals.

Solar, Transmission, conduction, slab loads etc. - ASHRAE Handbook of Fundamentals.

i. Building Pressurization:

Entire building shall be pressurized to reduce radon infiltration in accordance with ETL 88-9. Negative and positive pressurization of rooms shall be as required by paragraph MINIMUM VENTILATION REQUIREMENTS.

j. Security Engineering:

1. Include an emergency switch in or on the control panel located in the mechanical room(s) that immediately shuts down the heating, ventilating, and air conditioning (HVAC) system.

2. Secure exterior access to gas mains, and water supplies with manual shut-off valves.

3. Air intakes shall be located on the roof.

4. See Paragraph 1.5 for seismic design of mechanical piping, ductwork and equipment.

1.2.3. Mechanical Room Layout Requirements

The mechanical equipment room layouts shall be provided with ample floor space to accommodate routine maintenance of equipment and have headroom to accommodate required equipment. A minimum clearance of .67 meters shall be provided around equipment to allow unobstructed access for entry, servicing, and routine maintenance to include tube pull space for heat exchangers and boilers. Space provided in rooms for service and/or replacement of filters, coils, motors, and other equipment items shall be indicated with broken (dashed) lines on the drawings. Provisions for installation, removal, and future replacement of equipment shall be coordinated with the architectural design. The as-built drawings shall be provided using AutoCAD Version 14.01 in accordance with Section 01040, AS-BUILT DRAWINGS. The arrangement, selection, and sizing of all mechanical equipment shall be such that it can be broken down and removed from the building without dismantling any adjacent systems or structures. A 60 percent design submittal shall be provided for approval to verify mechanical room layout. Servicing and maintenance areas interior and exterior to building shall be sized according to manufacturer's recommendations for equipment.

a. Fire-rated walls shall be as required in Section 01003 ARCHITECTURAL BUILDING REQUIREMENTS.

b. Mechanical equipment shall be energy efficient per Executive Order 12902, 13123, ASHRAE/90.1 and UFGS. Where products are not yet rated as energy efficient products by ENERGY STAR (Registered Trademark) the Contractor shall provide products that meet the above criteria and be in the upper 25 percent of energy efficiency as designated by FEMP. If the Contractor determines that equipment meeting these requirements is not available, the Contractor shall notify the Government during the Submittal stage.

1.2.4. Mechanical/Electrical/Communication Equipment Coordination

Arrangement of all mechanical equipment and piping shall be coordinated with electrical/communication work to prevent interference with electrical/-communication conduits that may run through the mechanical room and to insure adequate space in shared chases. Mechanical equipment (pipes, ducts, etc. unless items solely serve the area) shall not be installed OVER OR WITHIN SPACE which is dedicated to transformers, panelboards, or other electrical/communication equipment unless items solely serve the area. When electrical/communication equipment is located in a mechanical equipment room, the dedicated electrical/communication space shall be indicated by a dashed line and noted "Electrical/Communication Equipment Space".

1.2.5. General Mechanical Requirements

As applicable, the following shall be provided for all new mechanical systems:

- a. All piping and equipment located in finished areas of the building shall be concealed or furred-in; exposed piping and equipment is only allowed in utility, equipment, storage and other rooms of this nature.
- b. Provide isolation valves, balancing valve, flow measuring device, and pressure/temperature test taps at all heating and/or cooling units, pumps, hot water unit heaters, hot water suspended ceiling cabinet unit heater.
- c. All coils shall be provided with valved drain and air vent connections.
- d. Air vents shall be installed on all high points in piping systems. Drain valves shall be installed at low points and at equipment which must be dismantled for servicing.
- e. Strainers shall be provided upstream of equipment such as chiller, pumps, coils and pressure reducing valves with a valve blow-down connection. Strainers are not limited to these locations.
- f. All vents, drain valves, and strainers which are located out of mechanical room spaces shall be provided with hose-end connections. All vents, drain valves, and strainers which are located within mechanical room spaces shall be piped to a floor drain.
- g. Provide bypass piping with a balancing globe valve or cock around all non-redundant control and regulating valves.
- h. All butterfly valves shall have spool pieces upstream and downstream so that the disk cannot enter any adjacent fitting.
- i. Except at pump intake connections, eccentric reducers shall not be used.
- j. Where steel flanges mate with cast-iron flanges, provide flat faces and full-face gaskets.

- k. Piping and supports shall not interfere with equipment maintenance access or pull space.
- l. Dielectric unions shall be installed between dissimilar metals in soldered and threaded piping systems and insulated flanges shall be installed for welded systems.
- m. All underground metallic lines, fittings, and valves; except for cast-iron shall be cathodically protected in accordance with Electrical Section paragraph entitled "Cathodic Protection".
- n. All exterior, underground non-metallic piping shall be buried with pipe detection tape.
- o. Water and natural gas service lines shall be metered where they enter the building and buried with pipe detection tape and tracer wire.
- p. A historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources and wetlands known to be on the project site: and/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be on-site or in the area are discovered during construction. The plan shall include methods to assure the protection of know or discovered resources and shall identify lines of communication between Contractor personnel and the Contracting Officer.
- q. A thermometer shall be installed on the supply and return piping to/from each coil. All thermometers shall be legible to service mechanics standing at ground level.
- r. Temperature/pressure taps shall be provided on the supply and return piping of each coil.
- s. Pipe taps, suitable for use with temperature or pressure probe, shall be located at each pressure gauge.
- t. Provide unions between shutoff valves and equipment items or valved flanges as appropriate to allow for equipment change out.

1.2.6. Roof Mounted Equipment

Except for plumbing vents, exhaust fans, and louvered intake penthouses, with motorized dampers at the exterior, no other mechanical equipment shall be located on the roof of the facility.

1.2.7. Vibration Isolation/Equipment Pads

Provide vibration isolation devices on all new floor-mounted or suspended mechanical equipment. All new floor mounted mechanical equipment shall be provided with 150 mm thick housekeeping pads which extend 150 mm all around equipment provided. Internally isolated air handlers shall be provided with base rails. The housekeeping pad and base rail or vibration isolators

cumulative height must accommodate the cooling coil condensate drain trap depth of seal required to overcome operating static pressure difference.

1.2.8. Permanent Maintenance Instrumentation

Provide sufficient instrumentation to aid maintenance personnel in balancing and/or troubleshooting mechanical systems. Instrumentation shall be provided in the media at each change in temperature and at all mixing points in air handling systems, at all discharges of air handlers, and at all return mains. Pressure gauges, thermometers, flow indicators, sight glasses, etc., shall be installed to be easily read from the adjacent floor. Provide one pressure gauge for equipment that requires differential pressure measurement points, such as across pumps. Pipe pressure gauge using isolation valves to allow reading of suction and discharge pressure with one gauge. This arrangement will allow an accurate reading of differential pressure even if gauge is not properly calibrated. Provide an isolation valve on all pressure gauges. Thermometers shall have separable socket thermo-wells. Allow for the removal, repair, or cleaning of flow measuring devices without having to shut down the system. Provide a portable meter, with appropriate range, for each type of flow measuring device installed.

1.2.9. Temporary Control Instrumentation

Instrumentation shall be provided for the field calibration of all control and monitoring devices, and for the commissioning of the mechanical systems. Provide local indication measuring instrumentation for each of the HVAC control system components. Local instruments are to be independent of sensing devices used for the control system. The exceptions are air flow measuring stations, turbine flow meters, pitot tubes, and other flow measuring devices that may be shared as sensing devices by local indicating devices and control system devices and are required to be permanent. Local instruments are to be of industrial quality, must be certified as being factory calibrated, and must be capable of field calibration using standard procedures. Measuring provisions shall be provided at each varying input and control output in the system.

1.2.10. Color Coding Scheme for Locating Hidden Utility Components

To identify points of access for maintenance and operation of hidden utility components, a color coding scheme shall be provided for all areas of the facility where suspended grid ceilings are installed. Color coding scheme shall meet the requirements of UFGS Section 09900, PAINTING, GENERAL.

1.2.11. Utility Interruptions

Certain limitations on utility interruptions apply. Unauthorized utility interruptions will not be permitted. Any work that requires a utility interruption shall be scheduled in advance. Outages are subject to postponement or cancellation by site authorities without prior notification. Coordination requirements of utility interruptions shall be in accordance with SECTION 00800 SPECIAL CONTRACT REQUIREMENTS. All utility interruptions shall be identified with notes on the project drawings.

1.2.12. Power Outage Start-Up

Upon an electrical power outage, all air handling units, pumps, and other major mechanical equipment shall shut down and shall be restarted in a logical and efficient manner. Timing between starts and sequence of equipment starting upon restoration of electrical power shall be provided and programmed into the HVAC temperature control system, with programming capable of being changed by the operating personnel.

1.2.13. Spare Parts Lists

Proprietary spare parts that require more than a 60-day lead time, and/or any special service tools shall be provided to the Government at the Final Inspection.

1.2.14. Equipment Room Diagrams

The following "As-Built" information, permanently mounted in a frame and covered by clear plexiglass, shall be provided in the mechanical equipment rooms:

- a. Air distribution diagrams and damper schedules.
- b. Heating hot water piping diagrams and valve schedules.
- c. Chilled water piping diagrams and valve schedules.
- d. Control diagrams, control device schedules, and sequences of operation.

1.2.15. Interior Design - Color Coordination

All mechanical items located in finished areas and on exterior walls, shall be coordinated with and painted to match the color scheme requirements of UFGS Section 09915, COLOR SCHEDULE.

1.3. EQUIPMENT IDENTIFICATION AND ABBREVIATIONS

This Section contains requirements for the identification and abbreviation of mechanical equipment.

1.3.1. Equipment Identification

Provide a brass name tag for each valve, temperature control device, control system device, etc., installed in all mechanical systems. In addition, all mechanical equipment shall be clearly identified with a conspicuously located, permanent label. Mechanical equipment shall be identified by type and sequence number. For example, the air handling unit in the building shall be identified as AHU-1, the first hot water pump shall be HWP-1, the second hot water pump shall be HWP-2, etc.

1.3.2. Abbreviations

The following list of abbreviations shall be used to describe the HVAC equipment types:

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Air Handling Unit	AHU
Boiler	BLR
Chilled Water Pump	CWP
Control Valve	CV
Domestic Water Heater	DWH
Exhaust Fan	EF
Expansion Tank	ET
Filter Bank	FB
Gov't Furnished Contractor Installed. .	GFCI
Gov't Furnished Gov't Installed	GFGI
Hot Water Pump	HWP
Horizontal Unit Heater	HUH
Local Control Panel	LCP
Motor Operated Damper	MOD
Not In Contract	NIC
ReHeat Coil	RHC
Relief Hood	RH
Supply Fan	SF

1.4. IDENTIFICATION OF PIPING

All exposed and concealed piping in accessible spaces shall be identified with color coded bands and titles in accordance with the requirements of UFGS Section 09900 PAINTING, GENERAL.

1.5. SEISMIC PROTECTION FOR MECHANICAL PIPING AND EQUIPMENT

This Section contains instructions and engineering requirements relating to the seismic protection design of new mechanical piping, ductwork, and equipment. The facility is to be considered standard occupancy type, nonessential, Group I, Category B and site classifications indicated in Section 01005 STRUCTURAL REQUIREMENTS and shall be designed in accordance with UFGS Section 13080 SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT. The mechanical seismic design for the facility shall meet the requirements of UFGS Section 15070 SEISMIC PROTECTION FOR MECHANICAL EQUIPMENT.

1.5.1. Piping

Piping within the facility, except fire protection piping, is not required to have seismic restraints per TI 809-04 Seismic Design for Buildings. All water pipes for fire protection systems shall be designed under the Zone 1 provisions of the current issue of the "Standard for the Installation of Sprinkler Systems" of the National Fire Protection Association NFPA 13, see Section 01008 FIRE PROTECTION REQUIREMENTS.

1.5.2. Ductwork per TI 809-04

Ductwork within the facility shall have, as required, seismic restraints per TI 809-04 Seismic Design for Buildings.

1.5.3. Floor Mounted and Suspended Equipment

See Specification 13080 for requirements in securing floor mounted and suspended equipment within the facility.

1.5.4. Miscellaneous Equipment

Miscellaneous items which consist of a number of individual components built into an assembly by the manufacturers may require additional internal reinforcements to meet Specification 13080, SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT.

1.6. THERMAL INSULATION OF MECHANICAL SYSTEMS

Insulation requirements of new mechanical systems, including insulation of plumbing systems and equipment, hot water piping systems, chilled water piping systems and equipment, and the insulation of the duct systems shall meet the requirements of UFGS Section 15080 THERMAL INSULATION FOR MECHANICAL SYSTEMS. Heating piping in heated spaces and conditioned spaces shall be insulated. Hot water piping shall be required to follow tabulated thicknesses. Domestic hot and cold water and recirculation hot water piping shall be insulated. All ducts shall be insulated in the mechanical rooms and all supply and return ducts shall be insulated. Internally insulated ductwork is not allowed on this project. Cold piping shall have a vapor barrier. High abuse areas shall have aluminum jackets such as janitor closets and mechanical rooms etc. Underground domestic hot and cold water and recirculation hot water shall be insulated with closed cell foam rubber or plastic insulation suitable for burial.

1.6.1. Insulation Covers

Provide reusable insulation covers at all check valves, control valves, strainers, filters, or any other piping component requiring access for routine maintenance. Insulation exposed to the weather or possible physical damage shall be covered by an aluminum metal jacket. All piping with metal jacket shall be identified on the drawings.

1.7. PLUMBING SYSTEM

This Section contains instructions and engineering requirements relating to the design of the new plumbing systems as required. A plumbing system consists of the domestic hot and cold water supply distribution system to the various plumbing fixtures; make-up water piping to the various hydronic type environmental control systems (i.e., expansion tanks, boilers, etc.); make-up water to fixtures, and fixture traps; soil, waste, and vent piping; and shall extend from connections within the structure to a point 1.5 meters outside the structure. The design of all plumbing systems shall, unless otherwise stated herein, comply with the most current National Standard Plumbing Code and shall meet the requirements of UFGS Section 15405 PLUMBING, HOSPITAL (see example Plumbing Fixture Schedule). Traps for lavatories, and sinks shall be chromium-plated, adjustable-bent tube, 20-gauge brass, where exposed. Where domestic hot and cold water and recirculation water is provided below floor the piping shall be type K soft copper with no joints below the slab. All backflow preventers shall be installed for accessibility per Uniform Plumbing Code and shall comply with the requirements of the Department of Environmental Quality (DEQ) of the State of Colorado. State licensed plumbers shall install and/or test backflow preventors and cross connections devices. Careful evaluation of the drain size for backflow preventers shall be exercised as failure of the

reduced pressure backflow assembly results in a significant amount of discharge water. For Fire Protection backflow preventor requirements see Section 01008 FIRE PROTECTION REQUIREMENTS. Lead content in the water distribution system (including in-line devices) shall comply with SDWA of 1998 w/amendments and ANSI/NSF 61, Section 8. In-line devices shall include water meters, building valves, check valves, meter stops, valves and fittings and backflow preventors. Underground soil, waste and drain may be cast iron piping.

1.7.1. Water Service Entrances

New water service entrance lines shall be installed below the recognized frost line (960 mm) below ground and enter the buildings through the mechanical room floor. New water service entrances shall be provided with a positive displacement type water meter up to and including 50mm and a turbine type water meter for greater than 50 mm, a pressure reducing valve and a reduced pressure principal backflow preventer with isolation valves located inside the building. The new water service line for the Clinic shall be protected with a pressure reducing valve due to the pressure surge when the existing base water system diesel pumps are operating or tested. Meters shall be provided with a direct non-resettable, digital readout. Meters shall have a pulse switch initiator capable pulse output of operating up to speeds of 500 pulses per minute with no false pulses and shall require no field adjustments or 4-20 mA output. Initiators shall provide the maximum number of pulses up to 500 per minute that is obtainable from the manufacturer. Meters shall be connected to the EMCS system. Wall hydrants shall be connected to the water service entrance providing domestic water to the building. See also paragraph LAWN IRRIGATION.

1.7.2. Piping Runs

Piping runs in buildings shall be arranged to not interfere with movement of personnel and equipment. Neither water nor drainage piping shall be located over electrical and communication equipment or panels. Domestic water piping located outside of mechanical equipment areas shall be routed in the ceiling space above the corridors. Water and waste piping shall not be located in exterior walls or other spaces where there is possibility of freezing. Where piping is to be concealed in wall spaces or pipe chases, such spaces shall be checked to insure that clearances are adequate to properly accommodate the piping. Water piping shall be designed not to exceed a velocity of 2.4 meters per second at full flow.

1.7.3. Pipe Materials

Table I in UFGS Section 15405 PLUMBING, HOSPITAL identifies available material alternatives for above/below ground soil, waste, and vent. Materials for domestic hot and cold water distribution systems shall be copper aboveground and copper type k underground. All piping 50 mm and smaller shall be soldered using 95/5 tin antimony solder, piping 65 mm and larger shall be brazed. Multi-flame torch is not required for soldering or brazing. The Tables shall be edited to indicate which materials shall be used for installation of each system.

1.7.4. Protection of Water Supplies

Cross connections between water supply piping and waste, drain, vent, or sewer piping is prohibited. Reduced pressure type backflow preventers shall be provided on all make-up water systems.

1.7.5. Fixtures

Plumbing fixtures shall conform to ASME standards and Executive Order 12902 with lead-free faucets. End-point devices shall meet lead leaching requirements of ANSI/NSF 61, Section 9, lavatory faucets, kitchen and bar faucets, residential ice makers, supply stops and endpoint control valves. In-line devices do not have to meet Section 9 bath and shower valves, all drains, backflow preventors). Work shall consist of but not be limited to the following: Coordinate location with the architectural plans. A water closet and lavatory, which are accessible to the physically handicapped, shall be provided in each of the toilet areas intended for use by the physically handicapped as shown on the architectural floor plan.

Flush control shall be mounted on the wide side of toilet areas within 508 to 990 mm above the finished floor.

In addition the following shall be provided:

- a. Electric water coolers located near all rest room entrances.
- b. Floor-mounted Janitor sink in Janitor's closet.
- c. Waterless urinals shall not be allowed; maintenance is required to the trap once every 6 months.
- d. Water conservation fixtures (low flow type) with automatic metering devices conforming to the UFGS Section 15405 PLUMBING, GENERAL shall be provided in all restrooms. Automatic operating hard-wire electronic sensor operated flush valves shall be provided for water closets in men's and women's toilets. Automatic operating hard-wired electronic sensor operated flush valves shall be provided for urinals in the Men's Toilet. Automatic operating hard-wired electronic sensors and faucets shall also, be provided in the Men's & Women's Toilets, public toilet and Staff Toilet. Battery-operated shall not be allowed. Hard-wired electronic sensors shall be provided with emergency pushbuttons for maintenance.
- e. Showers in Men's and Women's Toilets/Locker Rooms. Provide anti-scald or thermostatic mixing valve for all showers.
- f. Trap primers shall be provided for all toilet floor drains.

1.7.6. Janitor Closet Sinks

An enameled cast iron floor mounted type service sink shall be provided in all janitor closets. Overall sink dimensions shall be approximately 700 mm x 700 mm. The depth of the floor sink bowl shall be approximately 250 mm.

1.7.7. Electric Water Coolers

Bi-level, accessible or barrier-free, mechanically refrigerated electric water coolers shall be provided (as indicated on Architectural floor plans), with part of each suitable for use by the physically handicapped. Bottom spout unit shall be 675 mm above finished floor. Spout shall be 860 mm above finished floor. The push bar shall be front or front and side mounted. Coolers shall be lead-free and use CFC-free refrigerant R-134a. Units shall provide a minimum of 0.6 L/s at 10 degrees C. Coolers shall be certified to meet ANSI/NSF 61, Section 9 and meet lead leaching requirements of Section 9.

1.7.8. Wall Hydrants

Exterior freeze-proof wall hydrants with vacuum-breaker-backflow-preventer shall be located on outside walls at 30 m intervals of the facility for garden hose use. A wall hydrant shall be provided near all Mechanical Room's exterior doors. Exterior wall hydrants shall be mounted 600 mm above finished grade.

1.7.9. Wall Faucets

An interior wall faucet shall be provided in all Mechanical Rooms. Wall faucets shall be mounted 900 mm above the finished floor.

1.7.10. Service Stop Isolation Valves

For normal maintenance or replacement, servicing stop isolation valves shall be installed in water connections to all installed new equipment and new fixtures. In addition, stop valves shall be provided to isolate portions of systems so as to not require shutdown of entire systems. Stop isolation valves for piping and equipment shall be shown on the drawings. Service stop isolation valves to faucets shall meet ANSI/NSF 61, Section 9 lead leaching requirements.

1.7.11. Floor Drains

The mechanical equipment rooms shall be provided with sufficient floor drains to accommodate routine maintenance and drain down of equipment and piping within the room without running drain pipes over the floor. In addition, a floor drain shall be provided in each mechanical room, toilet rooms with two or more water closets, and janitors' closet. To prevent traps from drying out, deep seal traps or automatic trap primers shall be provided on all floor drains located in areas other than mechanical rooms.

1.7.12. Cleanouts

On straight runs of pipe, cleanouts shall be provided at not more than 30 meters apart. Cleanouts shall be provided at each change of direction of pipe and shall be provided at the base of all storm, soil, waste, and vent stacks. Cleanouts shall not be located in medical function rooms, but shall be located at the wall if in corridors, away from doors, and preferably in unoccupied rooms such as storage and janitor closets.

1.7.13. Plumbing Vents

Where feasible, combine circuit vents in a concealed space to a main vent through the roof in lieu of an excessive number of individual vents through the roof. All vent lines through roof shall be 100 mm and terminate with a minimum of 150 mm above finished roof. Where vents connect to horizontal soil or waste lines, the vent shall be taken off so that the invert of the vent pipe is at or above the centerline of the horizontal soil or waste pipe.

1.7.14. Duct Drainage

Outside air intake louvers and louvered penthouses shall be ducted and shall have provisions to dispose of melted snow and wind-blown rain which enters through the louvers. The duct seams shall be sealed watertight by soldering or brazing and a drain provided at the duct low point. The drain shall be routed to a floor drain. Duct access doors shall be provided near the louvers.

1.7.15. Domestic Hot-Water

Domestic water heater shall be located in the mechanical equipment room. Heater shall be gas fired with a combined or separate water storage tank. The capacity of the water heater shall be adequate to meet the peak hot water requirements of the facility and shall be designed in accordance with Chapter 48, Service Water Heating, of the 1999 ASHRAE HVAC Applications Manual and TM 5-810-5. An inlet water temperature of 4 degrees C. shall be used for sizing the water heater. Water storage temperature shall be approximately 60 degrees C. to prevent bacterial growth within the tank.

a. Hot water to faucets shall be limited to 40 degrees C. by a mixing valve. Relief valve vent piping and water heater drain piping shall be routed to building waste drainage system. The water heater shall be provided with recirculation pumps.

1. Domestic Water Heater Vent:

Domestic water heater vent shall be type "B", and shall conform to UL 441. Boiler stacks and domestic hot water water heater vents shall not be tied together. Height of vents shall be as required by NFPA 54 and shall be provided with a rain cap. Also, see paragraph Vents and Stacks.

1.7.15.1. Domestic Hot Water Recirculation System

Domestic hot water recirculating pumps shall be provided for the water heater. Pump sizing shall be in accordance with simplified pump sizing method 1995 ASHRAE Applications Manual. The system shall continually circulate domestic hot water in order to insure that domestic hot water is available at each fixture without delay. The domestic hot water recirculating pumps shall be all bronze for long life. In buildings operated on a nominal 40-hour week, a clock or other automatic control shall be installed on domestic hot water circulation pumps to permit operation only during periods of occupancy plus 30 minutes prior. The recirculation pump-storage tank thermostatic mixing valve shall be piped in accordance

with mixing valve manufacturer's instructions. The domestic hot water system design shall incorporate the following:

1. No dead legs.
2. Minimize fixture sub-branch piping length by routing mains and branches accordingly.
3. Piping from fixture anti-scald valves shall be sloped to provide gravity drain.
4. Size recirculation pump to maintain maximum acceptable velocity.
5. Do not oversize storage tank.

1.7.16. Storm Drainage

Where required storm drainage system shall include roof drains, overflow drains, leaders, and conductors within the building to a point 1.5 m outside the building. Where required by the architectural drawings, roof drains, with auxiliary overflow drains, shall be provided at the low points of the roof. Roof drain numbers and locations shall be based on ceiling space runs which do not interfere with the duct or any other distribution systems and their components. Storm water shall be routed through interior downspouts and piped directly to the facility storm drainage system. Roof drains shall be designed for a maximum rainfall rate of 111 mm per hour and shall be sized in accordance with the National Standard Plumbing Code. All elbows for the storm drainage and overflow drainage piping 250 mm and smaller shall be 90 degree short sweep elbows.

1.7.17. Cathodic Protection

Cathodic protection shall be provided for any new underground metallic piping, fittings, and valves except cast iron. Design of cathodic protection system shall in accordance with Section 01007 ELECTRICAL REQUIREMENTS, paragraph entitled "Cathodic Protection".

1.8. DENTAL COMPRESSED AIR SYSTEM

Air compressors shall conform to ASME B19.3. Medical (oil-free air) compressor installation shall conform to NFPA 99. Air compressor unit shall be a factory packaged assembly composed of two or more compressors each sized such that if one fails, the remaining compressor or compressors shall provide 65% of the standard demand, including 3-phase, 480 volts motor controls, switches, wiring, accessories, and motor controllers, in a UL listed NEMA 250, Type 1 enclosure. Tank-mounted air compressors shall be manufactured to comply with UL listing requirements. Air compressors shall have manufacturer's name and address, together with trade name and catalog number, on a nameplate securely attached to the equipment. The compressor shall start and stop automatically at upper and lower pressure limits of the system regulate pressure by constant speed compressor loading and unloading have a "manual-off-automatic" switch that, when in the manual position, the compressor loads and unloads to meet the demand and, in the automatic position, a time delay relay allows the compressor to operate for an adjustable length of time unloaded, then stops the unit. Guards shall shield exposed moving parts. Compressor system shall be provided with

automatic alternation system. Compressor motor shall be provided with an across-the-line type magnetic controller, complete with low-voltage release. An intake air filter and silencer shall be provided. Aftercooler and moisture separator shall be installed between compressor and air receiver, to remove moisture and oil condensates before the air enters the receiver. Aftercoolers shall be air cooled. The air shall pass through a sufficient number of tubes to affect cooling. Tubes shall be sized to give maximum heat transfer. Cooling capacity of the aftercooler shall be sized for the total capacity of the compressor. Means shall be provided for draining condensed moisture from the receiver by an automatic float type trap. Capacities of air compressor and receiver shall be as indicated.

1.9. ORAL EVACUATION SYSTEM FOR DENTAL OPERATORIES

1.9.1. High-Volume Oral Evacuation System (HVE)

The central HVE system shall be composed of standard manufactured products, complete with devices normally furnished and devices required herein. The central HVE system shall be supplied by an established manufacturer of commercially available, industrial quality vacuum system, as a complete system. The HVE shall be essentially a wet system, composed of two vacuum pumps, each of which shall be sized to support the full HVE requirement. The pumps shall be connected in parallel to the central wet separator tanks.

1.9.2. Vacuum Pumps

Pumps shall be self-governing, multistage, centrifugal type, of overhung or outboard design. The vacuum producer shall operate at a speed not to exceed 3,600 rpm and shall be connected to its driving motor by a flexible coupling. Bearings may be sealed or of the lubricatable type. A fan shall be connected directly to the vacuum producer shaft adjacent to vacuum producer shaft bearings to create a flow of ambient air over the bearing carrier while the unit is operating. A steel coupling guard encompassing the flexible coupling shall be installed between the motor and vacuum producer. Cases shall be cylindrical in design. Cases and end plates (inlet and exhaust heads included) shall be constructed of either heavy-gauge sheet steel rigidly welded at seams and sections, or of cast grey iron. Sheet steel end plates shall be either concave or convex. Inlet and exhaust connections shall be tangential to the vacuum producer except the inlet connection can be axial to vacuum producer and sized to allow free air movement through the vacuum producer, without flow restriction and shall have class 150 flanges. The vacuum producer input shall have an adjustable volume control valve, a directional flow valve and antisurge valve. The vacuum producer output shall have an exhaust silencer. Plumbing shall be connected to the vacuum producer through flexible sleeve connectors. Internal moving parts shall be constructed with not less than 3.2 mm clearance throughout to prevent damage by transient particulates. Impellers shall be constructed of fabricated sheet metal or high-tensile aluminum alloy, smooth on all surfaces to prevent imbalance by uneven dust deposits. Impellers shall be of the backward curved or radial design to provide optimal performance over a wide range of volume requirements. Impellers shall be securely attached to the vacuum producer shaft by set screws or clamps of high-tensile material. Each impeller shall be individually balanced. The complete assembly, with motor, shall not exceed 0.038 mm of vibration when given a running test. Power to operate the vacuum producer

shall be in direct proportion to the volume of air exhausted and shall not exceed the normal motor rating. The vacuum produced shall be substantially constant throughout the operating range of the vacuum producer. Each vacuum producer shall have a minimum capacity, rated in scfm at standard conditions (101 kPa) and 21 degrees C of 141.0 standard cu. m per sec. exhaust at 27 kPa vacuum. The vacuum producer shall be sized to produce the above designated performance standards at the above-sea-level elevation of the proposed installation site, and shall be so certified by the manufacturer by equipment tag or plate, or by letter of certification identifying the vacuum producer by serial number. The motor for the vacuum producer shall be of a standard NEMA MG 1, 3450 rpm, T-frame, dripproof design 480 Vac, 60 Hz, 3-phase with either sealed or lubricatable bearings. Operating temperature rise of the motor shall not exceed 22 degrees C. Each vacuum producer assembly shall be mounted on resilient isolator pads as recommended by the manufacturer. The pads shall not be fastened to the facility floor. Vibration transmission shall be limited to less than 5 percent of the lowest frequency of vibration. The vacuum discharge vent shall be installed through the roof and shall be located as far as practical, but not less than 900 mm from any outdoor air intake. The Contractor, at his option, may use other types of pumps such as positive displacement, including rotary and water ring. The acceptable vacuum level operating range is 21-27 kPa with minimum 21 kPa at the farthest utility center inlet at a flow rate of 3.3 L/s (per inlet).

1.10. INTERIOR GAS PIPING SYSTEMS

This Section contains instructions and engineering requirements relating to the design of new interior natural gas piping systems. Interior gas piping systems shall extend from the outlet of the new gas service regulator/meter assembly to the point of connection of each gas utilization device. See Section 01002, SITEWORK, for exterior gas piping. The aboveground gas piping system shall be steel designed in accordance with NFPA 54 and shall meet the requirements of UFGS Section 15190, GAS PIPING.

1.10.1. Gas Piping

Piping shall be sized in accordance with NFPA 54 to supply the demand without excessive pressure drop between the point of delivery and the gas utilization equipment. Minimum interior gas pipe size shall be 20 mm. The calorific value of the natural gas to be used in calculations for sizing equipment and piping is 31300 KJ per cubic meter. Gas piping shall be shown on the plumbing water Drawings.

1.10.2. Equipment Connections

The final connection to gas equipment shall be made with rigid metallic pipe and fittings. Accessible gas shutoff valve and coupling are required for each piece of gas equipment.

1.11. HYDRONIC HEATING SYSTEMS

Heating system shall be a forced-air/hot water system consisting of a natural gas fired boiler, water distribution system, circulating pumps, (and associated space heating equipment). The heating water piping system shall be used to circulate hot water to the heating equipment during the heating

season. Piping shall utilize reverse return configuration. The heating system designs shall meet the requirements of UFGS Section 15569 WATER AND STEAM HEATING; GAS; UP TO 20 MBTUH and, unless otherwise stated, shall comply with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks and Terminology of HVAC&R guide. Hot water pipe velocities shall be sized to not exceed 1.4 m/s.

1.11.1. Boilers

The hot water supply shall be heated to 95 degrees C. and supplied by natural gas-fired, cast iron type boilers rated for a pressure of 207 kPa. The boiler shall be provided with forced-draft burners unless noted otherwise, the two position (high-low) burner shall be interlocked with the hot water pump to provide a continuous flow of hot water to the facility at outdoor temperatures below 18 degrees C. (adjustable). The hot water system supply temperature to the space shall be automatically controlled by manufacturer's standard controls. The boiler shall be interlocked with the heating water circulating pumps, through the control system, such that the boiler's burner can not fire unless a pump is running and flow is confirmed throughout the boiler's piping system. The boiler shall have a minimum efficiency of 83 percent. The use of a natural draft boiler shall be allowed if the minimum efficiency of 83 percent can be met at the site elevation.

1.11.1.1. Boiler Connections

Design of boiler connections and auxiliary equipment shall conform to the requirements of ASME Boiler Code.

1.11.1.2. Low-Water Cutoffs

Float-type safety water feeders with low water cutoffs shall be provided for the hot-water boilers.

1.11.1.3. Water Column Connections

Provide crosses at right-angle turns on water column connections to boiler.

1.11.1.4. Smoke Connection

Boiler flue stack connections shall be in accordance with NFPA 211. Also, see paragraph Vents and Stacks.

1.11.1.5. Boiler Flue Termination

The boiler flue shall extend 5'-0" above roof penetration. The flue shall be provided with a rain cap fitting.

1.11.2. Heating Water Circulating Pumps

The heating water shall be circulated by two base mounted, end-suction, centrifugal pumps with mechanical seals. One pump shall be for standby. Each pump shall be sized for 100 percent of the maximum required heating water flow and 100 percent of the maximum system head pressure. The pumps capacity shall be based on a 95 degree C. supply and 82 degree C. return

water. Required flow rate and head loss shall be corrected for glycol. This corrected flow rate shall be used in selecting all other heating equipment, i.e., heating coils. The pumps shall be non-overloading allowing the pump to operate at any point on its characteristic curve. Each pump shall be provided with a suction diffuser and shall be mounted on a 150 mm thick concrete housekeeping pad. Each pump shall be provided with a calibrated bronze balancing valve. Pumps shall run at temperatures below 18.3 degrees C.

1.11.3. Expansion Tanks

A bladder type expansion tank shall be provided in the heating hot water piping systems. The expansion tank's precharge pressure and acceptance volume shall be selected based on the design of the piping systems. The STRUCURAL DESIGN ENGINEER shall be thoroughly consulted before hanging any thing from the building structure.

1.11.4. Air Separation Tanks

The heating hot water piping systems shall be provided with an air separation tank. The air separators shall include an automatic air vent and make-up water system, consisting of a pressure reducing valve, strainer, reduced pressure type backflow preventer and isolation valves.

1.11.5. Water Treatment Systems

Provide a mixture of 35% propylene glycol and 65% water for heating system. Provide a shot feeder (chemical feeder) at the heating water circulating pump to allow introduction of chemicals into the system. Provide the chemical treatment necessary to protect the heating system equipment from damage due to corrosion and freezing.

a. The boiler water treatment system shall be capable of feeding chemicals and bleeding the system to prevent corrosion and scale within the boiler and piping distribution system. The water shall be treated to maintain the conditions recommended by the boiler manufacturer. Chemicals shall meet required federal, state, and local environmental regulations for the treatment of boilers and discharge to the sanitary sewer. The services of a company regularly engaged in the treatment of boilers shall be used to determine the correct chemicals and concentrations required for water treatment. The company shall maintain the chemical treatment and provide all chemicals required for a period of 1 year from the date of occupancy. Filming amines and proprietary chemicals shall not be used. The water treatment chemicals shall remain stable throughout the operating temperature range of the system and shall be compatible with pump seals and other elements of the system.

1. The makeup water conditions reported per ASTM D 596 shall be as specified in UFGS Section 15569 WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH. Water softener and water analysis shall be as specified herein for makeup water. A water treatment plan shall also be provided as specified in accordance with UFGS Section 15569 WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH. The Design Build Contractor shall be responsible for providing a water analysis to determine type of treatment required.

1.11.6. Air Handling Unit Coils

- a. Each air handling unit coil shall be provided with a three-way control valve.
- b. Leaving air temperatures for heating coils (except for preheat) shall be between 38 to 41 degrees C.
- c. Coils shall be selected with no more than 3 m/s coil face velocity.
- d. See SAFETIES AND MISCELLANEOUS CONTROLS sections on Drawing M9-4.

1.11.7. Combustion Air

The mechanical equipment room shall be provided with combustion air louvers sized and located in accordance with NFPA 54. The combustion air louvers shall be provided without dampers and shall be ducted to within 300 mm of the mechanical room finished floor in order to minimize the potential for piping freeze-up in the mechanical room due to combustion air intake.

1.11.8. Piping

All supply piping shall be pitched up in the direction of flow, shall be designed without pockets which would permit accumulation of air, and shall be provided with vents at high points and drains at low points. Piping located outside of mechanical equipment areas shall be routed in the ceiling space. Slope of piping shall be as indicated in guide specifications.

1.11.8.1. Pipe Materials

All new heating water piping within the facility shall be black steel conforming to ASTM A53, Schedule 40 or copper.

1.11.8.2. Pipe Joints

Heating water pipe joints shall be of the following types:

- a. Heating water piping installed within the facility shall utilize threaded joints or welded joints. Welded joints and fittings shall be used for joints 65 mm and larger. Copper pipe joints 65 mm and larger shall be brazed. Grooved mechanical joints shall not be used.
- b. Connections to equipment shall utilize unions for pipe 50 mm and smaller and flanges for pipe 65 mm and larger.

1.11.8.3. Pipe Expansion

In runs of pipe 15 meters and longer, or in shorter runs where designer deems it is required, indicate size on project drawings the location of all anchors, bends, loops, and pipe guides to adequately limit and provide for pipe expansion. Do not use expansion joints in piping unless absolutely necessary and justified. Anchors and guides shall be indicated on the project drawings and detailed for installation in the building structure

provided. STRUCTURAL DESIGN ENGINEER shall be thoroughly informed of all forces generated.

1.11.9. Vents and Stacks

Stacks shall be in accordance with NFPA 211. Generally all stacks shall be of the prefabricated type with individual stack provided for each appliance. Stacks are generally used for forced draft applications. Vents shall conform to UL 441 and be Type B. Vents are generally used for atmospheric burners only. Vents can be tied together to a main vent. Combined stacks shall not be used for appliances with power burners or draft fans. Stacks and vents cannot be tied together. Height of stacks and vents shall be as required by NFPA 54 and shall be provided with a rain cap.

1.11.10. Heating of Mechanical Equipment Rooms

The mechanical equipment rooms shall be provided with a thermostatically controlled, hot water, horizontal, throw unit heaters to maintain a space temperature of 13 degrees C. minimum. The unit heater airflow shall be directed toward the combustion air intake(s) in order to warm the combustion air.

1.11.11. Unit Heaters

Thermostatically controlled, hot water unit heaters are permitted in non-administrative areas. Unit heaters shall cycle on and off to maintain setpoint. Unit heaters shall be provided in mechanical rooms.

1.11.12. Electric Resistance Heating

The use of electric resistance heating is not permitted.

1.12. HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS

This Section contains instructions and engineering requirements relating to the design of the new HVAC supply and distribution systems. The design of all systems shall comply with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks, Terminology of HVAC&R guide and to the requirements of NFPA Standards Nos. 90A and shall meet the requirements of UFGS Section 15895 AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEMS. Mechanical ventilation and ventilation requirements for occupants shall provide the minimum outdoor air supply rates for occupants in heated or air-conditioned facilities, or both, as required by the more stringent of MIL-HDBK-1191 or ASHRAE Ventilation Standard 62. Air distribution systems shall be designed to prevent infiltration at the anticipated prevailing wind. Cooling shall be produced by mechanical ventilation and air conditioning. Equipment capacities and flows shall be corrected for altitude on drawings (included in notes for schedules). Humidification shall be required if the occupied space will drop below 35% relative humidity without humidifiers. Humidifiers shall be provided as part of a packaged self-contained unit, if required. **The use of gas-fired "unit heaters and air handling units or furnaces" is not permitted.**

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a. See MIL-HDBK-1191, Appendix A for Noise Criteria unless otherwise indicated.

1.12.1. Air Handling Units

The air handling unit to be utilized in this construction includes, but is not limited to, variable air volume supply and return fans with variable frequency drives, discharge plenum, 90% filter, cooling coil, preheat coil, economizer with prefilter, and access sections. All unit sections shall be double-walled with 24 kg/m³ density insulation and exterior panel of minimum 18-gauge galvanized steel. No internal air handling unit insulation shall be exposed to the air stream.

1.12.2. Variable Frequency Drive (VFD)

The provided VFDs shall be the Pulse Width Modulation type. The provided VFD shall produce less than three percent (3%) overall harmonic distortion. The Contractor shall complete an electrical harmonic analysis on the facility to determine the necessary harmonic suppression requirements for the provided VFD units.

1.12.3. Terminal Units without reheat coil

Variable Air Volume Terminal units (VAV-TU) shall be provided on all units servicing interior rooms for service by AHU-1. The VAV-TU units shall be provided with air volume controls, digital temperature control system with occupant adjustable space temperature sensor.

Interior rooms shall be provided with terminal Reheat coil units (VAV-TRH) as a BID OPTION.

1.12.3.1. Terminal Reheat coil Units

Variable Air Volume Terminal Reheat units (VAV-TRH) shall be provided on all units servicing the perimeter walls for service by AHU-1 serving the new facility. The VAV-TRH units shall be provided with a hot water reheat coil for final conditioning of the supply air. The VAV-TRH units shall be provided with air volume controls, digital temperatures control system with occupant adjustable space temperature sensor.

1.12.4. Self-Contained Packaged Humidifiers With An Integral Steam Generator

Self-contained packaged humidifiers shall be provided as required by MIL-HDBK-1191.

Unit shall be self-contained electrode steam humidifier. Humidifier assembly shall include a 20-gauge steel cabinet that houses replaceable canister with auto-flush, solenoid fill valve, pressure regulating orifice, and auto control circuit. The humidifier shall be serviceable without disconnecting the high-voltage power supply and shall not interrupt unit operation. Electrode wires shall be connected with quick connect fasteners.

a. Microprocessor control shall maintain humidifier operation through fill and drain cycles based on water conductivity. Overflow and loss

of flow protection shall be provided along with a manual drain switch. A capacity adjustment potentiometer shall be provided. A high-water alarm with built-in time delay shall provide an audible and visual indication to change canister. Humidifier shall have full modulating control to provide 0 to 100 percent capacity. It must also provide a gradual increase in amperage in order to avoid undesirable surges of current. Humidifier shall be supplied with a solid state electronic sensor controller (humidistat compatible with DDC system to supply 30% - 60% R.H. minimum outside air required) capable of fully modulating the steam flow.

b. The humidifier fill waterline shall have an air gap to prevent backflow (or siphoning) of contaminated water into the water supply system. Water fill lines shall also have a water seal between a fill cup and the steam generator to prevent backflow of steam vapor when the drain valve is activated.

c. Humidifier shall incorporate electrical terminals for installation of controlling stat, duct high-limit stat, interlock switch to fan motor and/or to sail switch in duct. Humidifier manufacturer shall supply a stainless steel steam dispersion-tube which provides uniform steam distribution over the entire tube length and shall be supplied at various lengths to adequately span the widest dimension of the duct. Steam pipe from generator to dispersion tube shall be hard copper adequately sized to convey steam to the tube and to drain any condensate back to the generator.

1.12.5. Filtration

Indoor air quality is of primary concern, the combined supply air, including return and outside air, shall be filtered by a combination of 25 to 30 percent efficient pre-filter(s) and 90 to 95 percent final filter as determined by the dust spot test specified in ASHRAE Standard 52.1.

1.12.6. Ductwork

All supply ductwork upstream of the VAV Terminal Reheat boxes shall be round or flat oval sized by the Static Regain Method using a maximum of 15 m/sec at the air handler outlet. All other ductwork shall be sized using the equal friction method with 0.6 Pa per meter for supply ducts and 0.8 Pa per meter for return and exhaust ducts. Low velocity duct shall never exceed 8 meters/sec. Ductwork shall be galvanized steel in accordance with SMACNA guidelines except for fan connections. Ductwork serving Administrative areas shall typically be run above the ceiling in the corridors. Flexible ductwork used for supply shall never exceed 2 meters in length. Flexible duct is not allowed for return or exhaust systems. Return duct shall be provided for the communications room.

1.12.7. Ceiling Mounted Supply Diffusers

Ceiling diffusers shall be suitable for use in a lay-in ceiling or a gyp board ceiling and shall be located as necessary. All new diffusers shall be provided with a 4-way adjustable discharge pattern; standard diffusers with fixed discharge patterns are not permitted. Diffusers shall be sized to distribute the required quantity of air evenly over the space intended

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without causing noticeable drafts, air movement faster than 15 meters per minute in the occupied zone, or causing dead spots anywhere in the conditioned space. Maximum velocity of 3 meters/sec with a NC of 30 maximum. Maximum diffuser size shall be 600 mm X 600 mm, minimum size shall be 600 mm X 300 mm.

1.12.8. Ceiling Mounted Return Grilles

Ceiling return air grilles, suitable for use in lay-in ceilings or gyp board ceilings, shall be located as necessary. The maximum size of new return grilles shall be 600 mm X 600 mm, minimum size shall be 600 mm X 300 mm. Return grilles shall not be located close to outdoor openings or in locations where bypassing of supply air may occur. Recommended return air velocities based on free area of the opening shall be 3 meters/sec.

1.12.9. Supply and Exhaust Fans

Except for wall mounted propeller units, all fans shall be centrifugal type and connected directly to weather-proof louvers using ductwork. Low leakage motorized dampers shall be provided. Fans larger than 944 L/s in capacity shall be provided with V-belt drives. Care shall be taken to ensure that the noise level generated by exhaust fans and associated relief louvers is not transmitted to the exterior of the building. In-line fans located outside the main mechanical and electrical areas shall be provided with a manufacturers standard acoustical enclosure to inhibit noise transmission to the adjoining occupied spaces. Sone value of fans measured 1.5 meters from fan inlet shall be less than 30 sones outside the mechanical equipment room. Sound transmission data shall be submitted for approval and design shall indicate noise criteria on schedules. The mechanical room shall be provided with a supply fan for ventilation purposes in lieu of an exhaust fan.

1.12.10. Outdoor Intakes and Exhausts

New outdoor air intakes shall be located in areas where potential for air contamination is lowest. Maximize the distance between intakes and exhausts by maintaining a minimum distance of 10 meters between intakes and exhausts. Motorized low-leakage damper with blade and jamb seals shall be provided at all outside air intake and exhausts at the exterior of the building. If feasible, locate intakes and exhausts on different building faces. Maximum velocity through net area of air intakes shall be limited to 3 meters/sec. Required L/s shall be corrected for altitude.

1.12.11. Special Requirements

1.12.11.1. Public Toilet

The rest rooms shall be exhausted at the rate of 10 air changes per hour in order to maintain a negative room pressure or minimum AHU-1 outside air requirement whichever is greater. The required make-up air for the exhaust system shall be supplied by supply air for the heating/cooling loads (through air handling unit AHU-1) and through transfer ducts and ceiling grilles if amount of air is greater than 40 L/sec (sized for a velocity of 3 meters/sec).

1.12.11.2. Janitors Closet

The janitors closet shall be exhausted at the rate of 10 air changes per hour in order to maintain a negative room pressure. The required make-up air for the exhaust system shall be supplied through transfer ducts and ceiling grilles if amount of air is greater than 40 L/sec (sized for a velocity of 3 meters/sec).

1.12.11.3. Mechanical Equipment Rooms

a. The mechanical equipment room shall each be ventilated and cooled with outside air by thermostatically controlled supply fan; set to operate when the respective space temperature exceeds 30 degrees C. Size of fan shall be based on removal of heat generated in room so inside temperature shall not exceed 37 degrees C. at design ambient temperature, but the system design shall not be less than 20 air changes per hour. Sone values of fans measured 1.5 meters from fan inlet shall be less than 20 sones.

b. The mechanical equipment rooms containing gas burning equipment shall be provided with combustion air sized and located in accordance with NFPA 54. The combustion air shall be provided without dampers and shall be ducted down to within 300 mm of the mechanical room finished floor and ducted up to within 300 mm of roof level in order to minimize the potential for piping freeze-up in the mechanical room due to combustion air intake.

1.13. CHILLED WATER SYSTEMS

These systems shall meet the requirements of UFGS Section 15650 CENTRAL REFRIGERATED AIR-CONDITIONING SYSTEM and unless otherwise stated, shall comply with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks and ASHRAE 15.

1.13.1. Chilled Water Systems Design

The cooling load for the project shall be met by a scroll or reciprocating compressor type air cooled chiller. The chiller shall be provided with a minimum 5-year component warranty. Chiller shall have a minimum EER rating of 12 and minimum of 3 steps of unloading. Compressors shall be the semi-hermetic type with one compressor per circuit. Condenser coils shall have copper tubes/copper fins or copper tubes and aluminum fins. The chilled water system shall contain a glycol solution to prevent freezing and shall have a minimum total water volume of 19 liters per ton of cooling. Consideration should be given to an increased pipe size to provide the required volume in lieu of a storage tank. Chemical feed system shall be provided for the chilled water system and water in system shall be properly treated. Underground chilled water piping shall be pre-fabricated double-walled with metallic carrier pipe and PVC outer casing. Pipe system shall have built-in spacers to maintain concentricity of the pipe and the sleeve. Bladder type expansion tanks shall be utilized to accommodate system volume fluctuation. Bladder tanks shall be equipped with isolation and hopes-end drain valves to allow for draining the bladder without disconnecting the tank from the system. Bladder tank precharge pressure shall be calculated during design and shown on the design drawings. Piping shall be exposed in mechanical rooms and concealed in pipe chases and above ceiling where

possible. When selecting the chiller, the D/B Contractor shall take into account any inefficiency due to the glycol solution.

a. Each air handling unit coil shall be provided with a three-way control valve.

b. Coils shall be selected with no more than 3 m/s coil face velocity.

1.13.2. Chilled Water Circulating Pumps

The cooling water shall be circulated by a base mounted, end-suction, centrifugal pump with mechanical seals. The pump capacity shall be based on a 12.8 degree C. supply and 7.2 degree C. return water. The pump shall be non-overloading allowing the pump to operate at any point on its characteristic curve. The pump shall be provided with a suction diffuser and mounted on a 150 mm thick concrete housekeeping pad and shall be provided with a calibrated bronze balancing valve. The pump shall run at temperature above 18.3 degree C. (adjustable).

1.13.3. Communication Room Conditioning

The communication room in the new facility will be located adjacent to the computer room which is being conditioned with a computer room unit. This computer room unit shall be utilized to provide cooling and heating for the communication room. See Drawing M2-1 for location and duct arrangements.

1.14. BUILDING TEMPERATURE CONTROL SYSTEMS

Notwithstanding Section 00700 Contract Clauses FAR 52.236-5, "Material and Workmanship", the DDC/EMCS shall be manufactured by HSQ Technology Inc. in order to produce a fully connectable and integrated operating system with that of the Schriever AFB EMCS system. No other product will be acceptable. The competition Advocate authorizes sole source procurement. This Section contains instructions and engineering requirements for the design of the new building temperature control systems required for the operation of the building mechanical systems. The temperature controls shall be HSQ Technology Inc. and fully integrated (100% seamlessly compatible and with no interface device) and connected to the Base HSQ Technology Inc. EMCS system supplied by the Contractor and coordinated with HSQ Technology Inc. in this contract. The Schriever Air Force Base EMCS shall have monitoring and control capabilities of the Medical/Dental Clinic system. The design of the control systems for the HVAC equipment shall be in accordance with UFGS Section 15951 DIRECT DIGITAL CONTROL FOR HVAC, revised as herein indicated. HSQ Technology Inc. shall provide equipment and services, peer-peer communications including software database programming, graphics generation, calibration and end-to-end testing of the head-end computer (in Bldg. 600, Room 201) and this project's remote DDC panels, DTCs and building points. EMCS fiber shall be extended in accordance with Section 01007 ELECTRICAL REQUIREMENTS. The control system shall be designed to provide continuous and automatic control of all HVAC equipment. Where equipment is provided with a packaged control system, such as in the case of a boiler or chiller, the building control systems shall interface with the equipment's packaged control systems. The temperature control panels shall be located in the mechanical room(s). The number of control panels shall be dictated by the number of and types of equipment in the final design. This type of control

system(s) allows the EMCS operator to easily adjust setpoint, operating times and other system parameters, if and when necessary, after the building has been occupied.

a. Material and Workmanship, for the DDC/EMCS shall be manufactured by HSQ Technology Inc. in order that the systems installed are HSQ Technology Inc. and fully integrated and connected to the Base HSQ Technology Inc. EMCS system. No other product will be acceptable. The competition Advocate authorizes sole source procurement.

b. HSQ Technology, Inc. Subcontracted Work and Allowance shall consist of providing the following portion of the building temperature control system:

1. DDC panel(s) and Data Terminal Cabinet(s), complete with all equipment and devices necessary to provide the required control and monitoring. Panels, equipment and devices shall be compatible with those previously provided by HSQ Technology, Inc. at Schriever AFB.
2. All programming required at the DDC panel.
3. All programming required at the head-end computer to accept the new facility, including graphics.
4. All testing necessary to demonstrate the proper operation of the entire building temperature control system, from the field devices to the head-end computer.
5. Coordination with the Testing and Balancing subcontractor, attend commissioning, and provide necessary support during endurance testing. Attendance at pre-final and final inspections of mechanical systems. Providing necessary training to BCE shop staff.
6. Oversight and recommendations of the HSQ system during the design, including review of the design and attendance at 60% and 100% design review meetings. All submittals for HSQ items.
7. All wiring, conduit, cabling and other appurtenant items exterior to the panels and cabinets, as well as all field input/output devices and instruments shall be performed as part of the contractor's building bid.
8. The amount is for the HSQ subcontract only; any overhead, profit, or bond shall be included in the contractor's building bid.

1.14.1. General DDC Requirements

All mechanical systems and equipment shall be controlled by a local direct digital control (DDC) panel located in the facility Mechanical Room. The DDC panel shall operate in a standalone fashion. The DDC Control System design shall be provided, using UFGS Section 15951 DIRECT DIGITAL CONTROL

FOR HVAC, revised as herein indicated. To facilitate maintenance and to allow manual starting and stopping of equipment by maintenance personnel, a hard-wired Hand-Off-Automatic (HOA) control switch shall be provided for each new major piece of equipment (air handling unit, pump, exhaust fan, etc.) in order to override the automatic DDC start and stop functions. Coordination with and input from the Base, and existing facility User and HSQ Technology Inc. has been required in order to ensure that the appropriate system points are monitored.

a. The DDC system shall be capable of override control, which will start the HVAC system during unoccupied periods. The override control may be activated at each room thermostat. The override control shall not exceed three (3) hours duration. The override control on the thermostat shall activate only the associated terminal unit into occupied operation. All other terminal units shall maintain unoccupied operation. The unoccupied operation will result in the minimum air flow, due to the operating AHU, and unoccupied space temperatures.

b. Fire alarm condition on any fire alarm circuit shall automatically initiate the deactivation of the air handling units throughout the building.

c. All computing devices, shall be as defined in FCC Rules and Regulations FCC Part 15, and shall be certified to comply with the requirements for Class A computing devices and labeled as set forth in FCC Rules and Regulations FCC Part 15.

d. Temperature Control Contractor Experience - The temperature control Contractor shall have a working knowledge of HVAC control's systems and experience installing these systems. The Contractor shall provide for approval the names and qualification of supervisory personnel (i.e., Project Manager and/or Superintendent) that shall be used on this project. The Contractor shall also provide a list of references to be contacted from recent projects on which the proposed personnel performed similar duties. Approval shall be based on previous experience with HSQ systems, or other HVAC control's systems qualifications and demonstrated ability of proposed personnel to manage resources in an efficient and effective manner. Experience and supervisory personnel qualifications must be submitted and approved before submittal of any technical data.

e. All utility meters shall be connected to the base EMCS system to allow the necessary monitoring.

f. Fuses shall not be used for surge protection.

1.14.2. DDC/EMCS DDC Panels and DTC Panels

a. DDC PANEL (REMOTE TERMINAL UNIT)

DDC panels shall be provided by HSQ Technologies Inc. including associated interface boards, expansion boards, photo switches, circuit breakers, convenience outlets, power supplies and pulse to analog (PTA) converters. Any RTU not on UPS power shall have full battery backup. The battery shall have sufficient power to last for eight hours. Each DDC panel shall be

defined as including all specified DDC panel characteristics, including I/O functions as specified. All RAM based programs shall be downline loadable from the CCU, building controller or portable tester. All DDC default settings shall be saved in EPROM.

1. DDC panels shall be microcomputer-based with a minimum word size of eight bits. Each DDC panel shall have a minimum of 10 percent of its I/O functions as spare capacity. The type of spares shall be in the same proportion as the implemented I/O functions on the DDC panel, but in no case shall there be less than two spare points of each implemented I/O type. The DDC panel I/O functions shall be furnished complete, with no changes or additions necessary to support implementation of spare functions. Output relays associated with digital signals shall be considered part of the I/O function, whether physically mounted in the enclosure or separately mounted. Implementation of spare points by others shall necessitate only providing the additional field sensor or control, field wiring including connection to the system, and point definition assignment by the operator. The DDC panel shall contain all necessary I/O functions to connect to field sensors and control panels.

2. The DDC panel shall include: (deviations may be submitted for approval to the Contracting Officer)

(a) The following controls:

- (1) Main power switch.
- (2) On-off line switch - enables and disables communications with CCU/CCC and/or building controller.
- (3) Self test switch - exercise DDC panel functions.
- (4) Reset switch - initializes CPU operation.
- (5) DDC panel outputs disable switch.

(b) The following indicators:

- (1) Power on - includes one for each power supply voltage.
- (2) On Line (remotely-controlled).
- (3) GO-NO GO for self test of DDC panel and all communications functions.
- (4) DDC panel outputs disabled.

3. Sufficient memory shall be provided to perform all specified and shown DDC panel functions and operations, including all spares, but not less than 64K bytes.

4. DDC Panel Communications. DDC panel to CCU Communications: Communications interfaces shall be provided for specified DTM circuit between DDC panels and the CCU and/or the building controller.

5. The DDC panel shall contain hardware to support a power fail automatic restart as specified.

b. DATA TERMINAL CABINET (DTC)

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The DTC shall serve as an interface between each DDC panel, and the DE instrumentation and controls. No instrumentation or control devices shall be located within the DTC.

1. The DTC shall be an independent metallic enclosure not physically part of the DDC panel. The DTC shall be sized to accommodate the number of I/O functions required for each DDC panel, including installed spares, plus 25 percent expansion for each type of I/O function provided.

2. The DTC shall be provided with double sided screw type terminal strips. One side of the terminal strip shall be used for termination of field wiring from instrumentation and controls. The other side shall be used to connect the DTC to the DDC panel. Terminal strips shall have individual terminal identification numbers.

3. The DTC shall be a locking type mounting enclosure, with common keying and door switch wired to a DDC panel input for intrusion alarm annunciation in the MCR. DTC keying shall be identical to the DDC panel.

c. ENCLOSURES

Shall conform to the requirements of NEMA 250 for the types specified. Finish color shall be the manufacturer's standard, unless otherwise indicated. Damaged surfaces shall be repaired and refinished using original type finish. Enclosures installed indoors shall be NEMA 12 or as shown. Enclosures installed outdoors shall be NEMA 4 unless otherwise shown. Enclosures for DDC panels and DTC's installed outdoors shall contain a thermostatically controlled space heater to maintain the enclosure above the dew point.

d. POWER SUPPLY

The DDC panels shall have power conditioning hardware.

e. DDC PANEL SOFTWARE

1. Monitoring and Control - Each command shall be executed by the DDC panel only after all constraints checks have been passed. Each command point shall have unique constraints assigned. High and low reasonableness values or one differential rate-of-change value shall be assigned to each analog input. Values outside the reasonableness limits shall be rejected.

2. DDC Panel Self-Test Diagnostics - Each DDC panel shall have self-test diagnostic routines implemented in firmware. The tests shall include routines that exercise memory.

3. DDC Panel Resident Applications Programs - The Contractor shall provide the following applications programs as specified in paragraph APPLICATIONS PROGRAMS and as required by the I/O summary tables, and the associated constraints and interlocks as specified and shown, resident in the panel.

4. Software Control Blocks - The Contractor shall provide a hard copy of the software control blocks on media compatible with the DDC panel portable tester as specified herein.

f. DDC PANEL COMMAND SOFTWARE

1. Calculated Point - This value shall be created by calculating it from any combination of digital and analog points, or other data. The result of the calculation shall be an analog or digital point having all the properties of real points, including alarms, without the associated hardware. The calculated analog point shall have point identification in the same format as any other analog point. The calculated point shall be used in any program where the real value is not obtainable directly. Calculated point values shall be current for use by the system within 10 seconds of the time any input value changes.

2. Analog Totalization - Any analog point shall be operator assignable to the totalization program. Analog values shall be totalized within a given time period. This time period shall be defined uniquely for each point for intervals of 1 minute over an 8-hour period, 1 hour over a 1-week period, 1 week over a 1-month period, and 1 month over a 1-year period. At the end of the period, store the totals for future reference. Totalization shall then restart from zero for the next time period. The program shall keep track of the peak and total value measured during the current period and for the previous period. The operator shall be able to initiate a summary of all totalization information on a point, unit, building, or entire system. The operator shall be able to set or reset each totalized value individually. The operator shall be able to define, modify, or delete the time period on-line.

g. DDC PANEL APPLICATIONS PROGRAMS

1. Program Inputs - The Contractor shall select the appropriate program inputs listed for each application program to calculate the required program outputs. Where the specific program inputs are not available, such as no status indication called for on the I/O summary table, provide a default value to replace the missing input, thus allowing the application program to be tested. All analog inputs to applications programs shall have an operator adjustable deadband to preclude short cycling or hunting.

2. PID Tuning Program - Software shall be provided to generate a time based plot of the PID control action. The plotted variables shall be the process variable and the control output, which shall be displayed and updated in real time as the control parameters are changed. The major tuning parameters for the PID control loop shall be displayed on the plot.

3. Control Applications - Software shall be provided to allow the operator to generate control logic programs in free form which shall include the following basic capabilities:

- (a) If, else, then statement logic.
- (b) Do-loops.
- (c) Algebraic calculations.
- (d) Boolean logic statements.
- (e) Relational expressions.

1.14.2.1. Controllers

All modulating mechanical processes (e.g., temperature, pressure, flow control) shall be controlled directly by the local DDC control panel. Except for safety and protection functions, software logic shall be used in lieu of relay logic. The contacts of safety and protection function instruments shall be hardwired in series with the common side of each equipment's HOA switch, and their proper operation shall not depend in any way upon the DDC. HOA switch position shall be indicated on front-end graphics.

1.14.2.2. Digital Controllers

Digital controller blocks or points within the control panels shall utilize a full proportional algorithm.

1.14.2.3. Stand-Alone Operation

The local control panel shall be fully capable of stand-alone operation on a continuous basis. All programs, with the exception of those based upon real-time clock or calendar events, shall reside in the local DDC panel. During stand-alone operations bldg. shall operated 24/7 at existing setpoints.

1.14.3. Input/Output Devices

The control system shall utilize off-the-shelf input and output instruments (e.g., RTD sensors, actuators, relays) which are commercially available from third party vendors and who are independent from the DDC panel manufacturers.

1.14.4. Analog Sensors, Digital inputs & Digital outputs

EMCS points shall be as indicated on the project drawings. Liquid flow measurement for use by the DDC system shall be performed by paddlewheel-type flow sensors only. Pitot-type sensing elements may be installed for local instrumentation used for testing and balancing purposes only.

1.14.5. Cable and Wiring

Cable and wire for the DDC system shall be separate from the distribution system serving any other system. All cable and wiring shall be installed in conduit. The data transmission media (DTM) shall be provided by the Contractor. The DTM shall be fiber optics cable complying to Class A computing devices as set forth in FCC Part 15. The Contractor shall provide data transmission media (DTM). DTM shall be as specified and extended as shown on the electrical drawings in accordance with Section 01007 ELECTRICAL REQUIREMENTS.

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1.14.6. Control Valves

Sizing of control valves shall take into account upstream and downstream fittings and shall be in accordance with Instrument Society of America standard ISA S75.01-1985. Provide control valve schedule with Cv values.

1.14.7. Damper Actuators

All dampers shall be provided with 4-20 mA-operated damper actuators.

1.14.8. Valve Actuators

All valves shall be provided with 4-20 mA-operated valve actuators.

1.14.9. HVAC Control Drawings

HVAC control drawings, for both the 60 percent and Final submittals, shall be in accordance with SECTION 01336 - 60 PERCENT DESIGN REQUIREMENTS, and SECTION 01338 - 100 PERCENT DESIGN REQUIREMENTS. Control drawings for each facility shall include a system schematic section, a detailed sequence of control, a list of required components with a brief description of each component, a control panel detail, legend and schedules, a listing of input and output points and a matrix showing the point type, alarms and applications programs associated with each of the input or output points. EMCS details and points to be monitored shall be detailed on the contract drawings and follow the conventions as set forth in TM 5-815-2. System I/O summaries shall be detailed.

1.14.10. Control Schematic

The control schematic shall be a schematic representation of the HVAC system and the associated control equipment. Provide 100% control schematic for 60 % submittal phase. The control schematic shall be drawn to a large scale to allow for ample space to indicate any necessary performance parameters such as setpoint, etc. The control schematic shall be cross-referenced to the elementary diagram and the control panel detail by numbered terminal points. Each component shall be identified by a unique alphanumeric designator such as S1 for sensor number 1. This provides a means of cross-referencing to the description of components and the sequence of control. All major control items relative to the system shall be shown. This shall include, but shall not be limited to:

- Supply Fans
- Filters
- Cooling Coils
- Heating Coils
- Pressure Sensors/Switches
- Flow Sensors/Switches
- Freezestats w/manual reset
- Smoke Detectors w/connection to the FACP
- Temperature Sensors
- Valves and Valve Actuators
- Dampers and Damper Actuators
- VAV Boxes: Relative Humidity Sensors

1.14.11. Elementary Diagram

An elementary diagram or diagrams shall be provided showing the wiring of the control system devices. It shall be drawn to a large scale for easy reading and to allow space for indicating performance parameters. The elementary diagram shall be cross-referenced to the control schematic and the control panel detail through the use of numbered terminal points.

1.14.12. Sequence of Control

The sequence of control is a written statement of the operation of the system. Provide 100% sequence of control for 60 % submittal phase. It should be as detailed and complete as possible and it should refer to individual components by their alphanumeric designator whenever possible. The sequence shall break the overall system into sub-systems, such as supply fan control, humidification, dehumidification, mixed air control, pre-heating coil, heating coil control, cooling coil control, etc., and shall describe the operation of each of the subsystems. The sequence of control shall also describe the operation of all safety devices such as smoke detectors or freezestats, fire alarm interlock and shall describe the operation of the system in both the occupied, warm-up and unoccupied modes.

1.14.13. Description of Components

The description of components shall provide a generic description of the performance of each component. The components shall be referred to by their alphanumeric designator.

1.14.14. Control Panel Detail

The control panel detail shall show the intended mounting location of any devices that are to be located in the control panel or on the front face of the panel. All field sensors and controls shall be connected to data terminal cabinets to provide ease of diagnosis and repair of the system components. DTC panels shall be as specified in Section 15951 with installed spares plus 25 percent expansion of each type of I/O function being provided. Control panels and DTC panels shall be shown on mechanical drawings.

1.14.15. Legends and Schedules

The legend shall provide a definition of all symbols used in the control drawings. Schedules shall provide all necessary information to clarify the operation of the components or the overall system.

1.14.16. System Checklist and Startup Instructions

The designer shall develop Precommissioning Test Checklists, Functional Performance Test Checklists, and Startup Instructions for each system and item of equipment controlled by temperature control system and shall include them in the temperature controls Specification. Each system and item of equipment shall have its own separate Checklist and Startup Instructions. The Checklists and Startup Instructions shall be tailored to each individual component of the respective system or item of equipment and shall use the terminology and nomenclature used in the drawings and specification.

1.15. TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS

Testing, adjusting, and balancing required by UFGS Section 15990, TESTING, ADJUSTING AND BALANCING OF HVAC SYSTEMS, shall be complete, including all test and inspection reports, before starting the EMCS Field Test.

1.16. TECHNICAL SPECIFICATIONS

Government provided Corps of Engineers Guide Specification (UFGS) (available to the Design-Build Contractor on the advertised CD-ROM) shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for the facility. The specifications shall be edited in accordance with the designer notes associated with each specification and with the Specification Requirements (Division 01 General Requirement Specifications). In case of a conflict, the criteria found in the Specification Requirements (Division 01 General Requirement Specifications) shall take precedence. The provided specifications define the minimum requirements for items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals and testing that shall be provided for the facility. Where items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals or testing requirements are not specified in the provided specifications, special Sections within each applicable guide specification shall be prepared to specify those items. Specific items of equipment identified in the provided specifications but not required for the facility shall be edited out.

1.17. DESIGN ENERGY USAGE (DEU) COMPLIANCE CHECK

Design Energy Usage (DEU) estimates shall be calculated for the new building to verify compliance with MIL-HDBK-1191, Section 7, Table 7-2, The Energy Policy Act of 1992 and Executive Order 13123. Energy Usage Budget shall be done without process loads. Values indicated below shall be the maximum DET allowed. DEU shall be less than Design Energy Target (DET) values indicated in below.

Table I

Design Energy Target For This Project

<u>Building</u>	<u>Region</u>	<u>Design Energy Target (DET)</u>	<u>Hours/Day</u>
540 Dental Clinic 550 Dispensaries	2	740 M joules/sq. meter/yr	10/5

M = Million

1.17.1. Computer Simulation

The Design Energy Usage shall be calculated using a computer simulation. Method used must take into account the constantly changing temperatures, sun loads, etc., through a year's operation. Use of the program "BLAST" is encouraged. If "BLAST" is used, the "REVIEW SUMMARY REPORT" shall be included in the output report. Any program other than Building Load

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Analysis and Systems Thermodynamics "BLAST", "TRANE TRACE 600", Carriers' latest version, DOE 2.1.E or BESA (Canada) requires prior approval for use. Request for use must demonstrate compliance with the following:

1.17.1.1. Acceptable Engineering Procedures

The energy analysis and building simulation shall use a computer program which is based on acceptable engineering procedures. Load calculations and the systems simulation shall be on an hourly basis for 12 to 365 days. Although hourly data for 365 days is preferred, a minimum of 12 model days (a statistically average day per month) is acceptable. If calculations are based on less than 365 days, the weather data selected for these days shall be statistically derived.

1.17.1.2. Capable of Change

The computer program must be capable of changing the various cooling and heating loads and the thermostat settings to simulate building operations and to simulate deadband and deck/coil reset control strategies.

1.17.1.3. Cooling and Heating Loads Influencing the Building Design

The program must consider all cooling and heating loads which influence the building design. These include solar, outside air, people, lighting, equipment, etc., as well as taking into account the thermal time lag of materials.

1.17.1.4. Alternatives

Some of the alternatives that the program should be capable of analyzing include:

- a. Orientation of Building.
- b. Wall and roof construction and insulation.
- c. Dimensions of Building.
- d. Window area, solar shielding, tinted, and single or multiple glazed windows.
- e. Types of fuel.
- f. Central heating versus individual systems.
- g. Type of equipment.
- h. Type of mechanical systems, e.g., Constant/Variable volume, single zone/multizone.
- i. Type of lighting systems, e.g., standard incandescent or fluorescent and low wattage, high output lighting systems.

1.17.2. Summary Report

Provide a summary section in the separate energy analysis report and results in the design analysis. Include all input data such as U values, design temperatures, hours of operation, building population and size, etc. Include output data such as distribution percentages (lighting, heating, cooling, fan, etc.).

1.18. TRAINING

Training courses shall be conducted for 15 operating staff members designated by the Contracting Officer in the maintenance and operation of all systems (one week for DDC/EMCS controls). Two weeks notice shall be given the Contracting Officer prior to training. A training day is defined as 8 hours of classroom instruction, including breaks and lunchtime, Monday through Friday, during the daytime shift in effect at the training facility. For guidance in planning the required instruction, the Contractor shall assume that the attendees will have a high school education or equivalent, and are familiar with the systems. No training shall be scheduled until training manuals and O&M manuals have been approved by the Government. A minimum of 15 O&M manuals shall be provided for the instructions and 1 manual for each facility shall be given to the Contracting Officer to turnover to the Base Civil Engineer.

1.18.1. Training Course Content

The courses shall be taught at the project site for a period of 5 training days. The training courses shall cover all the material contained in the Operating and Maintenance Instructions, and O&M manuals the layout and location of each system and shall include the following for each system:

- a. Troubleshooting
- b. Diagnostics
- c. Calibration
- d. Adjustment
- e. Commissioning
- f. Repair procedures

(1) Typical systems and similar systems may be treated as a group, with instruction on the physical layout of one such system. The results of the performance verification tests and the calibration, adjustment and commissioning reports shall be presented as benchmarks of the system(s) performance by which to measure operation and maintenance effectiveness.

1.19. COMMISSIONING OF HVAC SYSTEMS

This section contains instructions and engineering information relating to the commissioning of HVAC systems, including the pre-commissioning checks and functional performance tests. Commissioning shall begin only after all work required in paragraphs entitled "Testing, Adjusting, and Balancing of HVAC Systems" and the "Temperature Controls System" have been successfully completed, and all test and inspection reports and operation and maintenance manuals required in other Section's specifications have been submitted and approved. The commissioning of HVAC systems shall meet the requirements of UFGS Section 15995 COMMISSIONING OF HVAC.

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a. Pre-commissioning Checks shall be performed for each item of mechanical equipment. Deficiencies discovered during these checks shall be corrected and retested prior to start of the Functional Performance Tests.

b. Functional Performance Tests shall be performed for each equipment item. Functional performance tests shall begin only after all pre-commissioning checks have been successfully completed.

c. Commissioning of HVAC systems shall begin only after all work required in related sections, including Sections HVAC Control Systems and TAB of HVAC Systems has been successfully completed. All test and inspection reports and O&M manuals shall be submitted and approved before commissioning is conducted.

1.20. PLUMBING FIXTURE SCHEDULE

P-1 WATER CLOSET:

Top rim of bowl shall be 381 mm above the floor: Siphon-jet, elongated bowl, top supply spud, ASME A112.19.2M, floor mounted, rough-in for (250 mm). Floor flange shall be copper alloy, cast iron, or plastic.

Gasket shall be wax type.

Seat - CID A-A-238, Type A, white plastic, elongated, open front.

Flushometer Valve -ASSE 1037, large diaphragm type with non-hold-open feature, backcheck angle control stop, and vacuum breaker. Minimum upper chamber inside diameter of not less than 66.6 mm at the point where the diaphragm is sealed between the upper and lower chambers. The maximum water use shall be 6.0 liters per flush.

P-1A WATER CLOSET, HANDICAPPED:

Top rim of bowl shall be 457 mm above the floor; other features are the same as P-1.

P-2 LAVATORY:

Manufacturer's standard sink depth, vitreous china ASME A112.19.2M, straight back.

Faucet - Faucets shall be center set, type or have separate handles. Faucets shall have metal replaceable cartridge control unit or metal cartridge units with diaphragm which can be replaced without special tools. Connection spout for center-set faucet shall be of rigid metal tubing. The flow shall be limited to 0.158 L/s at a flowing pressure of 551.3 Kpa. Spout shall be gooseneck type.

Faucet and Spout shall be 100% lead free and listed as conforming to NSF 61, Section 9.

Handles - Handles shall be wrist blade control type. Cast, formed, or drop forged copper alloy, 100% lead free.

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Drain - Strainer shall be copper alloy or stainless steel. See paragraph FIXTURES for alternative plastic accessories required.

P-2A LAVATORY, HANDICAPPED:

Vitreous china, ASME A112.19.2M, 507.6 mm wide by 685.3 mm deep. The flow shall be limited to 0.157 L/s at a flowing water pressure of 551.3 Kpa.

Faucet and Spout - Spout shall be gooseneck type. Faucet and Spout shall be 100% lead free.

Handles - Handles shall be wrist blade control type, 100% lead free.

Drain - Strainer shall be copper alloy or stainless steel.

P-2B LAVATORY, COUNTER-MOUNTED:

Manufacturer's standard sink depth, vitreous china ASME A112.19.2M, countertop.

Faucet and Spout - Faucet shall be center set type or have separate handles. Faucet shall have metal replaceable cartridge control unit or metal cartridge units with diaphragm which can be replaced without special tools. Connection for center-set faucet shall be of rigid metal tubing. The flow shall be limited to .157 L/s at a flowing pressure of 551.3 Kpa. Spout shall be gooseneck type. Faucet and Spout shall be 100% lead free.

Handles - Handles shall be wrist blade control type. Cast, formed, or drop forged copper alloy, 100% lead free.

Drain - Strainer shall be copper alloy or stainless steel. See paragraph FIXTURES for alternative plastic accessories required.

P-3 SINK, KITCHENETTE:

Ledge back with holes for faucet and spout single bowl 609 by 533 mm, "Bar Sink", stainless steel ASME A112.19.3M.

Faucet and Spout - Cast or wrought copper alloy. Aerator shall have internal threads. Spout shall be gooseneck type. Flow shall be limited to .157 L/s at a flowing water pressure of 551.3 Kpa. Faucet and Spout shall be 100% lead free. Faucet shall be listed as conforming to NSF 61, Section 9.

Handle - Cast copper alloy, wrought copper alloy, or stainless steel, wrist blade control type, 100% lead free.

Drain Assembly - Plug, cup strainer, crossbars, jam nuts, washers, couplings, stopper, etc. shall be copper alloy or stainless steel.

P-4 SERVICE SINK:

Enameled cast iron ASME A112.19.1M, copper alloy or stainless steel ASME A112.19.3M floor mounted 711 mm square, 171 mm deep.

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Faucet and Spout - Cast or wrought copper alloy, with top or bottom brace, with backflow preventer. Faucets shall have replaceable seat and the washer shall rotate onto the seat. Strainers shall have internal threads. Faucet and Spout shall be 100% lead free.

Handles - Handles shall be lever type, 100% lead free.

Drain Assembly - Plug, cup strainer, crossbars, jam nuts, washers, couplings, stopper, etc. shall be copper alloy or stainless steel.

Trap - Cast iron.

WATER COOLER DRINKING FOUNTAINS:

Water cooler drinking fountains: shall be self contained, conform to ARI 1010, use one of the fluorocarbon gases conforming to ARI 700 and ASHRAE 34 which has an Ozone Depletion Potential of less than or equal to 0.05, have a capacity to deliver 30.2 l/s of water at 10 degrees C. with an inlet water temperature of 62.2 degrees C. while residing in a room environment of 32.2 degrees C., and have self-closing valves. Self-closing valves shall have automatic stream regulators, have a flow control capability, have a push bar (front or front and side) actuation. Exposed surfaces of stainless steel shall have No. 4 general polish finish. Spouts shall provide a flow of water at least 100 mm high so as to allow the insertion of a cup or glass under the flow of water. These units shall be listed as conforming to NSF 61, Section 9.

P-5 Surface Wall-Mounted:

Surface wall-mounted units shall be 349 mm wide, 330 mm deep, and have a back height of 152.3 to 203 mm. The bowl shall be made of corrosion resisting steel. The unit shall have concealed fasteners and be for interior installation.

P-5A Handicapped:

Handicapped units shall be surface wall-mounted. The dimensions shall be 381 mm wide, 507.6 mm deep, with a back height of 152.3 to 203 mm. The unit shall clear the floor or ground by at least 203 mm. A clear knee space shall exist between the bottom of the bowl and the floor or ground of at least 685.3 mm and between the front edge of the bowl and the body of the unit of at least 200 mm. A 200 mm wide clear space shall exist on both sides of the unit. The spout height shall be no more than 913 mm above the floor or ground to the outlet. The spout shall be at the front of the unit and direct the water flow in a trajectory that is parallel or nearly parallel to the front of the unit with push bar (front or front and side) activation. The bowl shall be 165 mm high, made of corrosion resisting steel and be for interior installation.

2. PART 2 NOT USED

3. PART 3 NOT USED

-- End of Section --

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ELECTRICAL REQUIREMENTS

1. PART 1 ELECTRICAL DESCRIPTIONS AND NARRATIVES

1.1. GENERAL

1.1.1. References

Publications, codes, specifications and standards shall be used as the basic for the project design and shall include, but not be limited to the following:

IEEE C2	National Electrical Safety Code, 1997
NFPA 70	National Electrical Code (NEC), 1999
NFPA 75	Standard for the Protection of Electronic Computer/Data Processing Equipment, 1999
NFPA 101	Safety to Life from Fire in Buildings and Structures, 1997
NFPA 780	National Lightning Protection Code, 1997
NACE RP0169	Control of External Corrosion on Underground or Submerged Metallic Piping Systems, 1992
IES HANDBOOK	Illuminating Engineering Society Handbook, 2000
MIL-HDBK-1008C	Fire Protection for Facilities Engineering, Design, and Construction, 1997
MIL-HDBK-1191	
ADA	Americans with Disabilities Act - Accessibility Guidelines
LIGHTING STANDARDS	Corps of Engineers Standard Lighting Fixture Details Drawing Series No. 40-06-04 http://cadlib.wes.army.mil CADD Details Library, Electrical Details USACE Standard Details 40-06-04, Oct. 97
DISTRIBUTION STANDARDS	Corps of Engineers Standard Electrical Distribution Details. http://cadlib.wes.army.mil CADD Details Library, Electrical Details Electrical Service and Distribution
EI 16E500	Engineering Instructions - Lighting Design 1 September 1997
ETL 1110-3-403	Electrical Power Systems for Non Linear Loads

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ETL 1110-3-441	Electronic Ballasts for Fluorescent Lighting Fixture
ETL 1110-3-432	Exit Signs
ETL 1110-3-412	Transformer Application Guidance
NFPA-110	Emergency and Standby Power Systems
TM 5-811-1	Electrical Power Supply and Distribution
TM 5-811-2	Electrical Design, Interior Electrical System
TM 5-811-3	Electrical Design - Lightning and Static Electricity Protection
TI 809-4	Seismic Design for Buildings
MIL-HDBK-1190	Facility Planning and Design Guide

1.1.2. GENERAL REQUIREMENTS

Electrical design shall conform to MIL-HDBK-1191 as clarified by criteria as cited in the following requirements, codes and standards. Standard Detail No. 40-06-04, "Lighting Fixtures", shall be used where applicable. Lighting criteria shall be as cited in EI 16E500, "Engineering Instructions - Lighting Design, 1 September 1997."

1.1.3. STANDARD PRODUCTS

Material and equipment shall be a standard product of a manufacturer regularly engaged in the manufacture of the product and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. The label or listing of the Underwriters Laboratories, Inc., will be accepted as evidence that the materials or equipment conform to the applicable minimum standards of that agency. In lieu of this label or listing, a statement from a nationally recognized, adequately equipped testing agency indicating that the items have been tested in accordance with required procedures and that the materials and equipment comply with all contract requirements will be accepted.

1.1.4. Seismic Protection

Seismic Protection for electrical equipment shall be designed and installed in accordance with TI 809-4 and with the requirements of Seismic Protection for Miscellaneous Equipment Specification Section 13080 and Seismic Protection for Electrical Equipment Specification Section 16070.

1.2. COORDINATION OF ELECTRICAL CRITERIA

All electrical criteria provided in this section shall be coordinated with the architectural section, mechanical section, fire protection section, structural section, interior design section, civil and site section, and other sections as required. The number and location of all electrical equipment indicated in the electrical requirements are approximate. Contractor's design shall meet the intent of the electrical requirements

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provided in this section. Contractor shall coordinate the final locations of all electrical equipment with the BASE USERS.

1.3. EXTERIOR PRIMARY ELECTRICAL DISTRIBUTION SYSTEM

The primary electrical distribution system nearest connection point is at existing manhole MHP1 which is a part of primary circuit B-6. Contractor shall provide a new underground primary electrical distribution system and pad mounted transformer. The new underground primary electrical distribution system shall connect to the existing pad-mounted switch, Contractor shall assume all associated costs. Transformer shall be located in a screened Mech/Elec space a min. of 7.62 meters from the Medical/Clinic Clinic or per Mil HDBK 1008C. Secondary feeders and conduit from the transformer to the facility main distribution panel will be the Contractors responsibility. Metering shall be provided and located at the main transformer. Working clearance around transformer shall be as shown on drawings with a minimum of 13'-0" clearance in front of transformer. The pad-mounted transformer shall be oil-filled, 3-phase, 4-wire WITH 5.75% impedance and provided in this Contract. The transformer windings shall be copper only. The primary cable shall be 15 KV, ethylene-propylene rubber (EPR), 133% insulation. Coordinate all clearance requirements with Base Electrical Engineer.

1.4. NOT USED

1.5. EXTERIOR UNDERGROUND SECONDARY ELECTRICAL DISTRIBUTION REQUIREMENTS

Exterior secondary electrical distribution system to the Medical/Dental Clinic shall be 480Y/277 volt, 3-phase, 4-wire underground feeder in conduit to a Main Distribution Panel (MDP) located in the electrical room. Main facility feeder and main distribution panel shall be sized to have a minimum of 25% spare capacity above the estimated maximum demand for the building. Design of the exterior secondary electrical system shall be in accordance with Electrical Distribution System, Underground - SECTION 16375 and the requirements of this section. The high voltage ductbank shall be encased in concrete. The low voltage ductbank shall be encased in concrete (refer to TM 5-811-1). All ductbanks that crosses any road shall not cut the road, but the ductbank shall bore under the road and be located not less than 900 mm below the top of the road.

1.5.1. Underground Service Entrance, Feeder, Branch Circuits

Service entrance conductors, branch and feeder circuits shall be single conductor Type THW, THWN, or SE in accordance with NFPA 70. Service entrance conductors, underground feeder and branch circuits shall be copper conductors in conduit. Aluminum conductors and direct buried cables shall NOT be used.

1.5.1.1. Conduits

Conduits shall be single, round-bore type, with wall thickness and fittings suitable for the application. Conduits shall be non-encased direct-burial, thick wall for low voltage circuits. Top of conduit shall be 609.6 mm below finished grade.

1.5.2. Fall-of-Potential Ground Testing Method

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The fall-of-potential ground testing method shall be used to validate grounding. Because of the sensitivity of the equipment, the ground resistant valve shall be lower than 25 ohms. If the 5 ohm communication ground is bonded to the power ground, then the system ground resistance shall be 5 ohms or less.

1.6. EXTERIOR LIGHTING SYSTEM

Area lighting shall be provided for all parking lots, walkways, above all exit doors, and area signage. Lighting fixtures shall utilize high pressure sodium lamps. Pole/fixture heights shall be no greater than 12.2 meters above finished grade. Poles/fixtures shall equal existing poles/fixtures on BASE. Fixture/pole finish shall be anodized bronze to match existing lighting pole finishes. The design of the lighting poles shall take into consideration that the yearly average maximum wind speed (50 year average). Design shall be in accordance with IES Handbook, Exterior Lighting Specification Section 16528, Electrical Distribution System, Underground Specification Section 16375, Engineering Instructions - Lighting Design, and the requirements in this section.

1.6.1. Area Lighting

Area lighting shall be provided for all areas noted above. Lux/footcandle levels for the parking lot lighting shall be 5/0.5 lux measured at 304 mm above finished grade. The lighting level in the handicapped parking area shall be 10/1. Area lighting contactors and controls for the building shall be installed in the electrical rooms. Exact location of lighting controls shall be coordinated with the USER during the design of the project. Area lighting control shall be connected into BASE lighting control system. Reference paragraph "Lighting Control" below.

1.6.1.1. Walkway Lighting

Walkway lighting fixtures shall be high pressure sodium bollards. Walkway lighting bollards shall be placed along main walkway leading to the facility and spaced to meet IES lighting criteria. The bollards shall match Base standards. Walkway lighting control shall be connected into BASE lighting control system.

1.6.1.2. Parking Lot Lighting

Parking lot lighting fixtures shall be high pressure sodium. Lamps shall be high pressure sodium and sized to meet lighting criteria. Poles shall not be located within the parking lot areas. Poles shall be located outside the parking lots behind the curbs. Conduit stub-outs shall be provided to allow extension of parking lot lighting to the future parking lot. Parking lot lighting control shall be connected into BASE lighting control system. Reference paragraph "Lighting Control" below.

1.6.1.3. Exterior Building Lighting

Exterior building lighting fixtures shall be as indicated in the Corps of Engineers Std. Det. No. 40-06-04. Lamps shall be high-pressure sodium and sized to meet the IES lighting criteria. Fixture(s) shall be mounted at each entrance to the building. All exterior high pressure sodium light fixtures shall have lamps with dual re-strike elements. Exterior building lighting fixtures shall be controlled by a lighting contactor from within

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the Medical/Dental Clinic. Reference paragraph "Lighting Control" below. Fixtures shall be mounted on the exterior of the building. Compact fluorescent with battery pack lights shall be used for egress and high pressure sodium lights shall be used for security.

1.6.2. Lighting Control

Install lighting controls in the electrical room or where otherwise indicated in this section. Lighting controls installed outside the electrical rooms shall be in weatherproof enclosures. Install lighting controls per requirements of this section. Exact location of all lighting controls shall be verified with the USER during design of the project. Lighting controls shall be of the contactor type with a manual override by an astronomical time clock.

1.6.3. Underground Lighting Circuits

Provide underground branch circuits for all exterior lighting circuits. Branch circuits shall be insulated copper conductors with insulated grounding conductor in conduit. Aluminum conductors are NOT acceptable. Direct buried conductors are NOT acceptable. All underground lighting conductors shall be in Schedule 40 PVC conduit. Top of conduit shall be 609.6 mm below finished grade. Conduits under traffic areas shall be encased in concrete and reinforced (refer to TM 5-811-1).

1.6.3.1. Lighting Pole Grounding

All exterior lighting poles shall be grounded at the base of the pole. Provide a 19 mm x 3048.0 mm copper glad grounding rod at each pole.

1.6.3.2. Conductors

Cables shall be type USE conforming to UL 854, with copper conductors and type RHW or XHHW insulation conforming to UL 44, and shall include green ground conductor. Cable shall be provided with insulation of a thickness not less than that given in TABLE 15.1 of UL 854. Cable shall be rated for 600 volts. Parts of the cable system such as splices and terminations shall be rated not less than 600 volts. Conductors larger than No. 10 AWG shall be stranded.

1.6.3.3. Conduits

All conduits for underground circuits shall be Schedule 40 A/C. Conduits shall be single, round-bore type, with wall thickness and fittings suitable for the application. Conduits shall be non-encased direct-burial, thick wall for low voltage lighting circuits.

1.6.4. Building Lighting Circuits

All exterior fixtures mounted on the surface of the building shall be wired from within the building and shall conform to the Interior Wiring Methods paragraph of this section. No building lighting circuits shall be surface mounted.

1.7. CATHODIC PROTECTION SYSTEM

A sacrificial anode cathodic protection system shall be provided for all underground metallic lines, fittings, valves and fire hydrants. In addition to the anodes, all metallic pipes must be provided with a coating system. The systems shall be designed and installed in accordance with NACE RP 169 Standards. Criteria for determining the adequacy of protection shall be in accordance with NACE RP-01-69 and shall be selected by the corrosion engineer as applicable. Design shall be in accordance with Cathodic Protection System, (Sacrificial Anode) - Specification Section 13110 and the requirements of this section. Each anode shall be connected to the structure through a flush-to-grade test station with a concrete maintenance collar. At least one test station shall be provided on each valve, fire hydrant and metallic pipe.

1.8. UNDERGROUND CABLE MARKINGS

A color-coded plastic warning tape, 101.6 mm wide, shall be placed within the trench 305 mm above all buried utility lines. RED shall be supplied for the buried electrical lines and ORANGE shall be supplied for all the buried communication lines.

1.9. INTERIOR ELECTRICAL DISTRIBUTION SYSTEM

The interior secondary distribution voltage within the building shall be 480Y/277 volt, 3-phase, 4-wire. Conductors shall be copper. Aluminum conductors shall not be used. The voltage (480 volts, 3 phase) shall be used for larger motor loads, equipment loads and all other required loads. The lower voltage (277 volts, 1 phase) shall be used for all lighting loads. Provide step down transformers, 480V-208Y/120V K-factor rated, to be used for all receptacle, small motors, computer, and all other loads as required. Step down transformers shall have a 25% spare capacity for future loads. Transformer windings shall be copper. Aluminum shall not be used. K-rating transformers shall be provided in accordance with the load being served. The Contractor shall provide calculations showing the need for K-rating transformers. Transformers that serve non-linear loads such as the computer receptacles shall have K-rated transformers. Contractor shall provide the secondary system to meet the requirements of this section. Design shall be in accordance with Electrical Work, Interior - Specification Section 16415 and the requirements of this section. Series rated protective devices are not acceptable.

1.9.1. Service Equipment

Service equipment/disconnecting means shall be provided in the Main Distribution Panel (MDP) located in the electrical room. Service equipment disconnecting means shall be integral to MDP. Service disconnect means shall be of the bolt-on circuit breaker type. Secondary surge protection shall be provided at the Main Distribution Panel. Main distribution panel (MDP) shall be sized for 25% future capacity. All circuit breakers shall have electronic trips. All multi-pole breakers shall be internally mechanically interlocked together (refer to Specification Section 16415).

1.9.1.1. Main Distribution Panel (MDP)/Panelboards

Main distribution panel and panelboards shall be in metal-enclosures with bolt-on molded case circuit breakers. Enclosures shall be general-purpose

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wall mounted type. Busses for the main distribution panel and all panelboards shall be copper. Aluminum shall not be used. Each phase, neutral and equipment grounding bus shall be clearly shown on the drawings. Short circuit rating of all busses shall be clearly indicated on the drawings. The Main Distribution Panel (MDP) shall not be equipped with a 200% neutral.

1.9.1.2. Electrical Rooms

The branch circuit electrical rooms shall be accessed off a primary through corridor and the entry door shall swing 180 degrees as not to impede traffic flow in the corridor or violate clearance requirements of NFPA 70. A minimum of 20 percent additional free wall space should be included to accommodate this project's requirements.

1.9.1.3. KWHR Meter

Metering shall be provided by the Contractor and be mounted on the exterior of the pad-mounted transformer. See paragraph 1.3. Coordinate with the Base Electrical Engineer on all requirements to provide meters with pulse initiators for connection to the BASE EMCS - (Energy Monitoring and Control System). All metering shall read and indicate true RMS values.

1.9.1.4. Protective Coordination Study

A full protective coordination study to include overcurrent and short circuit analysis shall be done on the electrical distribution system for the building. The study shall include the interior electrical distribution system back to the secondary side of the Utility Co. pad mounted transformer. Coordinate with the Utility Co. for the amount of fault current available or assume an unlimited primary amps.

1.9.2. Panelboards

Lighting and appliance branch-circuit panelboards shall be of the bolt-on molded case circuit breaker type conforming to NEMA AB-1 and UL 489 and shall be located in the electrical room.

a. Load-center type panelboards and half size breakers shall not be allowed.

b. Panelboards shall not exceed 1981.2 mm in height from the finished floor.

c. All panelboards shall have after construction, a minimum of 25 percent spare capacity for all loads. Panelboards shall have a minimum of 25 percent spare circuit breakers. Spare circuit breakers shall be redundant of the type of circuit breaker being provided in the panelboard.

d. Panelboard busses shall be copper. Aluminum busses are not allowed.

e. Panelboards that are feeding receptacle loads shall be provided with 200% neutral busses.

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1.9.3. Motors

Motors shall be of sufficient size for the duty to be performed and shall not exceed the full loading rating when the driven equipment is operating at specified capacity under the most severe conditions encountered.

a. All motors shall have a continuous-duty classification and be based on a 40 degree C ambient temperature reference.

b. All motors shall be derated for altitude.

c. All permanently wired polyphase motors of 747 watts or more shall meet the minimum full-load efficiencies as indicated in the Electrical Work, Interior Specification Section 16415.

d. All motors shall have a service factor not less than 1.15.

1.9.4. General Purpose Receptacles

Duplex receptacles for general-purpose applications shall be NEMA 5-20R, 20 amp, 125 volt, 2-pole, 3-wire grounding type. A maximum of five duplex receptacles may be connected to a receptacle circuit. Receptacle circuits shall not supply lighting loads. General-purpose duplex receptacles shall be grey in color. General-purpose duplex receptacles shall be located in the facility as follows:

a. Provide general duplex receptacles every 3.0 meters along the walls in all areas of the building. For small rooms that do not have 3.65-meter walls, a minimum of one (1) outlet shall be installed on each wall. Receptacles shall be mounted 457 mm above finished floor.

b. Provide a general-purpose duplex receptacle adjacent to each mirror for each sink position located in the bathrooms. Receptacles shall have (GFI) ground fault interrupters. Mount receptacles 1219.2 mm above finished floor.

1.9.5. Special Receptacles

Ground Fault Interrupter (GFI) receptacles shall be provided in all rest rooms, sink countertops, janitor's closet, kitchen, laundry and other wet locations. Weatherproof receptacles for exterior use, shall be mounted in a box with a gasketed, weatherproof, cast-metal cover plate and gasketed cap over each receptacle opening with (GFI). Exact location of the receptacles noted below shall be coordinated with the USER during the design of this project. Provide NEMA 5-20R 20 amp, 125 volt, 2-pole, 3-wire grounding type, duplex receptacles on dedicated circuits in the following locations:

a. Provide duplex receptacles for all vending machines/microwave to be installed by the government in the staff room.

b. Provide a duplex receptacle for each electric water cooler.

c. Provide duplex receptacles for the government furnished and government installed copier and fax machine in the Reception Area.

d. Provide duplex receptacles for the government furnished and government installed copier and fax machine in the Manager Office.

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e. Provide a duplex receptacle with ground fault interrupter on the exterior of the building adjacent to each exit door of the building. Mount receptacles 609.6 mm above finished grade.

f. Provide six (6) duplex outlets every 1828.8 mm along each wall in the Electrical/Communications Rooms. Outlets shall be NEMA 5-20R, 20A, 125 volt, duplex outlets with a maximum of two outlets on a dedicated branch circuit. Receptacles shall be installed 457 mm above finished floor.

g. Provide six (6) duplex outlets for counter-top office equipment, equally spaced under the counter with through-the-counter top grommets provided for cords. Outlets shall be NEMA 5-20R, 20A, 125 volt, duplex outlets with dedicated branch circuits. Receptacles shall be installed 305 mm above the floor.

h. Provide one (1) dedicated NEMA 5--20R, 20 amp, and 125-volt duplex receptacle for each EMCS OR DCC panel. Each receptacle provided for the EMCS panels shall have a dedicated branch circuit.

i. Provide one (1) dedicated NEMA 5-20R, 20 amp, 125 volt duplex receptacle for the Data rack. Receptacle provided for the Data rack shall have a dedicated branch circuit and ground.

j. Convenience outlets located in waiting area spaces and spaces accessible to children shall be a tamper-resistant type such as one that requires twisting the inner portion of the device to activate current and at the same time prevents a child from inserting any foreign object, specification grade, heavy-duty, safety type grounding. Removable caps or plugs do not meet this requirement. Outlets shall be mounted 1372 mm from the bottom of the outlet to the top of the finished floor. Type SG-62 outlets mounted in counter backsplash do not require the 1372 mm mounting height.

k. Provide one (1) dedicated NEMA 5-20R, 20 amp, 125 volt, duplex receptacle at each CATV outlet location.

1.9.6. Computer Outlets

Computer outlets shall be duplex, NEMA 5-20R, 20 amp, 125 volt, 2-pole, 3-wire grounding type receptacles. A maximum of three duplex computer outlets shall be connected to a receptacle circuit. Computer outlets shall be located at each JSN Number M1800 as shown in the "Design Requirements Diagram" located in Tab 2 of the RFP. Circuits shall be sized using 600 volt-amp per computer. Neutral conductors shall be sized at 133% of the phase conductors. Computer outlets shall be labeled as "COMPUTER". Mount the outlets 457 mm above finished floor. Computer outlets shall be mounted adjacent to the Telephone/Data outlets. Maintain a separation of 152.4 mm from the Telephone/Data outlets. Exact location of all Computer Outlets shall be verified and coordinated with the USER during the design of the project. Computer outlets shall be located in the buildings as follows:

1.9.7. Other Loads

Contractor shall provide electrical power to the following loads either by receptacle or direct wired as applicable:

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a. Intercom: Contractor shall provide power as required for Contractor provided and installed intercom system.

b. UPS: Contractor shall provide two 30A, 120V circuits for each UPS system.

c. TV: Contractor shall provide one 20A, 120V duplex receptacle next to each TV outlet.

1.9.8. Architectural/Mechanical Connections

Contractor shall provide branch circuits, disconnect switches, magnetic starters, and all other related electrical equipment and material for all architectural, mechanical equipment and environmental equipment to be installed in the project (includes the facility and site). This shall include all HVAC units, unit heaters, pumps, exhaust fans, irrigation control panel and all other mechanical equipment in the facility. Designated sinks shall be controlled by passive infrared sensors hard wired to the building electrical distribution system. No batteries shall be allowed for this purpose. Night access through the main entrance door shall be restricted by the use of an electromagnetic door release actuated from the reception's desk. Contractor shall coordinate these electrical requirements with the architectural and mechanical requirements.

1.9.9. Radiology Shielding

The shielding requirements for the x-ray room doors, floors, walls and ceiling shall be detailed on the drawings.

1.9.10. Commissioning Test Plan

Provide a power system commissioning test plan, and an exterior electrical work interface-phasing plan. A commissioning test plan shall include the normal power interface requirements. All power outages shall be coordinated and approval obtained in advance. Coordinate all outages with Base Electrical Engineer.

1.10. INTERIOR LIGHTING SYSTEM

The interior design shall be in accordance with the requirements in this section, the IES Handbook, the "Electrical Work, Interior" Specification - Section 16415, and the requirements in this section. Light fixture selection and color shall be coordinated with the Architect and Interior Designer.

1.10.1. Illumination Levels

Maintained illumination levels shall generally not be less than the values listed in the following table.

<u>ROOM TYPE</u>	<u>INTENSITY [lux]</u>	<u>CRI</u>	<u>CCT</u>
Corridor	200	82	4100
Reception Counter	540	82	4100
Electrical Room	300	82	4100
Lobby	325	82	4100
Mechanical Rooms	300	82	4100
Offices Areas	540	82	4100

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Restrooms	325	82	4100
Communication Room	500	82	4100
General DTR's (CRI greater than 90)	1600	90	5000
Exam Room	500	90	5000
Patient Care Areas	300	82	4100
Waiting Rooms	300	82	4100

All maintained illumination levels shall be measured at 762 mm above finished floor.

1.10.2. Conservation Requirements

Illumination levels, in conjunction with energy conservation, shall be obtained by the most life cycle cost-effective techniques including, but not limited to, the following:

- a. Provide multiple switching of multi lamp fixtures or multiple switching of fixture groups in large rooms, or both, to permit lighting levels to be varied.
- b. Provide energy efficient, environmentally safe, low-mercury lamps (green lamps) and solid-state electronic ballasts.
- c. Provide occupancy sensors in restrooms.

1.10.3. Interior Lighting Fixture Types

- a. General offices, service corridors and general purpose areas shall typically have 600 mm x 1200 mm recessed fluorescent troffers with virgin acrylic prismatic lenses and two to four lamps per fixture.
- b. Offices, laboratories and areas with numerous personal computer (PC) workstations and/or video display units shall have low glare and low brightness type luminaires to reduce reflected images on the PC screens and to improve visual comfort.
- c. Small storage rooms, mechanical rooms, electrical rooms and communications rooms shall have 300 mm x 1200 mm surface or pendant mounted fluorescent luminaires with wire-guards, two lamps per fixture.
- d. Electronic ballast shall operate at a frequency where there can not be any interference with infrared sensors, radio frequency equipment operation, and bar code equipment. All ballasts shall operate at or above 40 KHZ.

1.10.4. Incandescent Lighting Fixtures

Incandescent lighting fixtures shall NOT be used.

1.10.5. Egress and Exit Lighting Fixtures

Egress and exit lighting design shall be in accordance with NFPA 101 and AF ETL. Exit lights shall be green LED type XL1 - Corps of Engineers Std. Det. Dwg. No. 40-06-04. Egress lighting shall be provided from room fluorescent light fixtures with an emergency battery and lamp supply unit installed. Typical through out the facility. Refer to ETL-110-3-432 for performance requirements for LED exit signs.

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1.10.6. Lighting Controls

a. Interior Lighting Controls

- 1) General room lighting shall consist of single on-off toggle switch. All light switches shall be grey in color.
- 2) In large rooms, lighting controls shall consist of multiple on-off switches to allow switching of individual zones.
- 3) Timer switches shall be provided in rooms with infrequent use, such as janitor closets, equipment storage rooms and public toilets.
- 4) Special areas such as entries and the lobby shall be switched through photoelectric control units to switch the lights off when daylight is sufficient to illuminate the space.

b. Exterior Lighting Controls

- 1) Exterior lighting shall be controlled through Base lighting control system. Provide contactor type controls. Locate light controls in main electrical room. Provide astronomical time clock for a manual override to the Base lighting control system.

1.11. COMMUNICATION SYSTEMS

1.11.1. Fire Alarm System

Provide new fire alarm system for this building. Fire alarm system shall be the Honeywell System Technology (HST) system (XLS 200 panel) and communicate with the base Fire Department, Building 717 using the Honeywell XBS network. Contractor shall provide all programming required at the base Fire Department to accommodate the new Medical/Dental Clinic fire detection and alarm system. The system shall include, but not be limited to controls, power supplies, initiating devices (flow, tamper and P.I.V. switches), notification appliances, conduits and wiring for a complete and operating fire alarm system. Provide smoke detectors in the communications room, in addition to detectors required by specifications and/or codes.

Provide sufficient notification devices to provide required audible and visual notification coverage per NFPA 72 and ADA guidelines. All visual notification devices shall be synchronized type. One area shall be covered by one visual notification signal, unless required by code to have more signals (i.e., corridors) or space size. Provide visual notification appliances in all bathrooms and any other public areas. Submit calculations showing sound pressure levels in all spaces. Calculations shall take into account appliance type, appliance spacing, building construction, etc. Possible calculation method is available in "The SFPE Handbook of Fire Protection Engineering." Provide spare capacity for 100 additional addressable initiating devices.

For further nurse call requirements, see Government edited Section 13851, FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE, in attachments.

1.11.2. Premises Distribution System

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System shall include, but not be limited to; grounding, horizontal cabling, jacks, racks, patch panels, patch cords, ladder rack, backboards, cross connecting of stations, conduits, cable trays for a complete and operation structured cabling system. The base will install copper voice entrance and fiber optic data entrance cables in contractor furnished conduits.

Provide fiber optic patch panel for government furnished entrance fiber optic cable and wall mounted connector blocks with protectors for government furnished copper entrance cable. Provide 304 mm wide, 76 mm load depth cable trays in all corridors. Provide voice/data outlets shown on Data Requirements Diagrams and associated cabling as a minimum. Provide rack patch panels for all station drops. Provide 2.4-meter patch cords for 60% of all station drops. Voice drops are to be punched down on wall mounted 110 blocks.

Provide a minimum of 1 voice/data outlet and associated cabling system in all rooms, unless shown above to have more outlets. Provide telephone circuit back to nearest voice backboard for: cooler and freezer alarm dialers, duress system. Provide one wall station outlet in the following areas: in all electrical rooms and mechanical rooms. In addition to the above requirements, provide voice/data outlets in all computer rooms (2 minimum and 1 wall outlet).

Provide Fiber optic jumpers to the security system, fire alarm system and energy management system.

For further nurse call requirements, see Government edited Section 16710, PREMISES DISTRIBUTION SYSTEM, in attachments.

1.11.3. Public Address System

Provide ceiling mounted speakers in the following areas: Corridors, hallways, waiting areas, conference rooms, lounges, reception areas and any other areas shown on the Design Requirements Diagrams. Provide volume controls in all conference rooms. Provide paging interfaces for local paging from phone system and Base wide page.

For further nurse call requirements, see Government edited Section 16770, PUBLIC ADDRESS SYSTEMS, in attachments.

1.11.4. Television Distribution System

Provide system of amplifiers, splitters, cables, conduits, outlet boxes and device plates for a complete and operational television distribution system. Use cable tray system (see premises distribution system above for cable tray) for cables in corridors, provide conduit in all other areas. Base communications will provide head-end equipment with an output level of 0 dBm maximum. Install outlets as shown on the Design Requirements Diagrams.

For further nurse call requirements see Government edited Section 16781, TELEVISION DISTRIBUTION SYSTEM (TVDS), in attachments.

1.11.5. Nurse Call System

Provide tone/visual nurse call system for all locations shown on the Design Requirements Diagrams. For further nurse call requirements see Government edited Section 16750, NURSE CALL SYSTEM, in attachments.

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1.11.6. Cooler/Freezer Temperature Alarms

Provide programmable 2 channel voice dialer with keypad, microphone, 4-hour battery backup, flush hinged locked enclosure, door mounted test button, door mounted power and dialing indicators. Provide one unit for each cooler and freezer on drawings; mount 1220 mm above finished floor. Connect to dry contacts in cooler/freezer. Connect to telephone system with 4 pair unshielded twisted pair, Category 5e cable.

1.11.7. Security System

Provide complete security system for system of conduits in Pharmacy. Location of devices is shown on the Design Requirements Diagrams. Coordinate exact requirements with Base security.

1.12. EMCS (ENERGY MONITORING AND CONTROL SYSTEM)

The building shall be wired for EMCS (Energy Monitoring and Control System). All EMCS sensors will be installed per Mechanical specifications. See Mechanical Section 01006 for EMCS options and requirements. Provide the required cable and conduit from each EMCS OR DDC panel to the wall mounted EMCS patch panel located in the Mechanical Rooms. Provide power as required for all EMCS or DDC components (such as dampers, VAV boxes, control panels, etc.) requiring power.

1.13. WIRING METHODS

Wiring shall conform to NFPA 70, Electrical Work, and Interior Specifications SECTION 16415 and the requirements of this section.

1.13.1. Power Conductors

Conductors shall be copper only. Aluminum conductors are not allowed. Minimum conductor size shall be #12 A.W.G. Conductors shall be installed in conduits. Power and lighting conductors shall be 600 volt, Type THHN (in dry locations), and THW or THWN (in wet locations). Cabling systems such as Mineral-Insulated cables, metallic armored cables and nonmetallic-sheathed cables shall not be allowed on this project.

1.13.2. Conduits

Wiring shall consist of insulated conductors installed in rigid aluminum conduit, rigid zinc-coated steel conduit, electrical metallic tubing, or intermediate metal conduit. Plastic conduit shall not be allowed. Raceways shall be concealed within finished walls, ceilings, and floors.

1.14. GROUNDING SYSTEM

The grounding system shall be designed in accordance with NEC Article 250 and the following criteria. In general, all metallic building components including reinforcing steel and miscellaneous metals shall be part of an electrically continuous ground system. Steel studs used in interior wall construction, T-bars of the ceiling grid, diffusers of the air distribution system, and door hardware are exempt from this bonding requirement. Bonding shall be by exothermic welding or the brazing of a copper wire between

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components. Design shall be in accordance with Electrical Work, Interior Specification - Section 16415 and this section.

1.14.1. Communication Grounding System

Grounding for the main telephone service shall be provided by installing an insulated #6 copper grounding conductor in 27 mm conduit from the Master Grounding Bus (located in the Communication Room) to the building service ground.

1.14.2. Grounding Conductors

A green equipment grounding conductor, sized in accordance with NFPA 70 shall be provided, regardless of the type of conduit. Equipment grounding bars shall be provided in all panelboards. The equipment grounding conductors shall be carried back to the service entrance grounding connection or separately derived grounding connection. Grounding conductors shall be provided in all branch (including lighting circuits) and feeder circuits.

1.14.3. Earth Electrode System

A counterpoise (ring ground with ground rods) shall be provided around the perimeter of the facility. Conductor shall be a bare No. 1/0 AWG. The maximum resistance measure in accordance with IEEE STD 81 shall not exceed 10 ohms under normally dry conditions. Ground rods shall be 19.05 mm x 3048 mm copper clad ground rods.

1.15. LIGHTNING PROTECTION SYSTEM

NFPA 780, Appendix H - Risk Assessment Guide conducted for this building indicates a risk (R) 9, which is in the severe category. Based on this assessment, the Contractor shall provide a lightning protection system in accordance with LIGHTNING PROTECTION SYSTEM - SECTION 13100 and NFPA 780. The lightning protection system shall have a U.L. master label. Lightning protection system provided shall include (but not limited to) air terminals, main conductors, concealed down conductors, bonding conductors, and 19.05 mm x 3048 mm ground rods interconnected by a counterpoise routed around the perimeter of the building. A minimum of four (4) test wells located at opposite corners of the facility shall be provided. Test wells shall include a ground rod (19 mm x 3048 mm copper clad) bonded to the building counterpoise grounding system. Test wells shall be provided with concrete maintenance collars. All connections made below grade shall be done by exothermic weld process. Alternate bonding methods will be allowed to metal bodies (vent hoods, exhaust stacks, etc.) which have light enough weight to make exothermic welds impractical. All conductors shall be copper, except where attaching to aluminum equipment such as exhaust fans.

1.16. FIRE DETECTION AND ALARM SYSTEM

The fire detection and alarm system requirements are provided in Fire Protection SECTION 01008. Design shall be in accordance with Fire Detection and Alarm Specification, Addressable - SECTION 13851 and the requirements of Fire Protection SECTION 01008. Fire alarm system shall be addressable to each device. Hybrid systems, which have addressable loops, are NOT acceptable. Fire alarm system shall be the Honeywell System Technology (HST) system (XLS 1000 panel). The fire detection system shall be compliant

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with Honeywell using an XBS network, connected via peer-to-peer communications to/from the Operations Support Facility fire alarm control panels(s). The main building fire alarm panel shall be located in the Vestibule adjacent to the main entrance door. Alarms (horns) shall sound/flash local to the facility and also report back to the BASE Fire Department, Building 717 via connection at the Operations Support Facility fire alarm panel(s). Contractor shall provide all programming required at the Child Development Center, at the Operations Support Facility fire alarm panel(s) and at the BASE Fire Department to accommodate the Medical/Dental Clinic fire detection and alarm system.

1.17. TESTING

Contractor shall provide all testing required by all specifications provided to the Contractor. Testing shall include low voltage conductors and communication conductors and all other mandatory testing required by the specifications provided with this section.

1.18. TRAINING

a. Training courses shall be conducted for five (5) operating staff members designated by the Contracting Officer in the maintenance and operation of the Fire Alarm System. A training day is defined as eight (8) hours of classroom instruction, including breaks and lunchtime, Monday through Friday, during the daytime shift in effect at the training facility. For guidance in planning the required instruction, the Contractor shall assume that the attendees will have a high school education or equivalent, and are familiar with the systems. No training will be scheduled until training manuals and O&M manuals have been approved by the Government.

b. The course shall be taught at the project site for a period of three (3) training days. The training courses shall cover all the material contained in the Operating and Maintenance Instructions, the layout and location of each system and shall include the following for each system: preventive maintenance, troubleshooting, diagnostics, calibration, adjustment, commissioning, and repair procedures. Typical systems and similar systems may be treated as a group, with instruction on the physical layout of one such system.

1.19. TECHNICAL SPECIFICATIONS

Government provided technical guide specifications (UFGS Sections available for Contractor on the advertised CD-ROM) shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for the project. The provided specifications define the minimum requirements for items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals and testing that shall be provided for the project. Where items of equipment, materials, installation, training, operating and maintenance instruction, O&M manuals or testing requirements are not covered in the provided specifications, special sections within each guide specification shall be prepared to cover those subjects. Specific items of equipment identified in the provided specifications but not required for the project shall be edited out. Government compliance review is required for any specification addition or deletion. As a minimum, the following specifications shall be provided:

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- a. LIGHTNING PROTECTION SYSTEM - SECTION 13100
- b. CATHODIC PROTECTION SYSTEM (SACRIFICIAL ANODE) - SECTION 13110
- c. FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE - SECTION 13851
- d. SEISMIC PROTECTION FOR ELECTRICAL EQUIPMENT - SECTION 16070
- e. INSULATED WIRE AND CABLE - SECTION 16120
- f. ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND - SECTION 16375
- g. MOTOR CONTROL CENTERS, SWITCHBOARDS AND PANELBOARD - SECTION 16403
- h. ELECTRICAL WORK, INTERIOR - SECTION 16415
- i. EXTERIOR LIGHTING - SECTION 16528
- j. PREMISES DISTRIBUTION SYSTEM - SECTION 16710
- k. NURSE CALL SYSTEM - SECTION 16750
- l. PUBLIC ADDRESS SYSTEMS - SECTION 16770
- m. TELEVISION DISTRIBUTION SYSTEM (TVDS) - SECTION 16781

2. PART 2 NOT USED

3. PART 3 NOT USED

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SECTION 01008

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SECTION 01008

FIRE PROTECTION REQUIREMENTS

1. PART 1 FIRE PROTECTION REQUIREMENTS

1.1. GENERAL PARAMETERS

Fire protection shall be based on sound fire protection engineering principles that gives safeguards against loss of life and property by fire, consistent with the mission, risk involved, and economical utilization. Fire protection criteria shall be based on the following code requirements:

NFPA 10	Portable Fire Extinguishers, 1998 Edition
NFPA 13	Sprinkler Systems Installation, 1999 Edition
NFPA 45	Fire Protection for Laboratories Using Chemicals, 1996 Edition
NFPA 70	National Electrical Code, 1999 Edition
NFPA 72	National Fire Alarm Code, 1999 Edition
NFPA 75	Electronic Computer/Data Processing Equipment, 1995 Edition
NFPA 90A	Installation of Air Conditioning and Ventilating Systems, 1999 Edition
NFPA 101	Life Safety Code, 2000 Edition
NFPA 780	Lightning Protection Code, 1997 Edition
UBC	Uniform Building Code, 1997 Edition
MIL-HDBK-1008C	Fire Protection, 10 June 1997
MIL-HDBK-1191	Department of Defense Medical and Dental Treatment Facilities Design and Construction Guide, 24 May 1996
UFAS	Uniform Federal Accessibility Standards
ADA	Americans with Disabilities Act, 1991 Edition

All applicable requirements of the aforementioned codes shall be incorporated into the design. Life Safety Code, NFPA 101 relative to this design shall give special attention to the application of fire codes as they relate to Life Safety. Features of fire protection based on the following shall be included in the design: automatic operating devices; exiting for inhabitants and the protection of egress components; personnel safety in hazardous areas; appropriate ratings of partitions, doors and windows; travel distances; common paths of travel; occupancy types; hazard of occupancies and their contents; isolation from the remainder of the facility, etc.

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Applicable requirements of the Uniform Building Code shall also be included in the design. These shall include the following: Types of construction; Fire area limitations; increases to allowable floor areas; separation of structures.

All military construction must comply with the code requirements in Military Handbook 1008C.

1.1.1.1. Types of Occupancies and List of Hazardous Areas/Essential Equipment

1.1.1.1.1. Occupancy Classification

The Clinic will be classified as Business Occupancy in accordance with Paragraph 4.4.1(c)/MIL-HDBK-1008C and the Life Safety Code (LSC), NFPA 101. Anesthetic gases are not piped to any of the Medical or Dental Treatment Rooms.

1.1.1.1.2. Classification of Hazard of Contents

Occupancy Hazard classifications will basically be in compliance with the requirements of Appendix "B", MIL-HDBK-1008C, as noted below:

- (a) The following areas will be designated as Light Hazard occupancy:

Outpatient Clinics
Radiology areas
Administrative areas
Waiting areas

- (b) The following areas will be designated as Ordinary Hazard Group 1:

Storage areas (100 SF or less)
Electrical Closets (rooms)
Communication Closets (rooms)

- (c) The following areas will be designated as Ordinary Hazard Group 2:

Pharmacy
Clinic/Ancillary Storage Areas (greater than 100 SF)
Medical Laboratory (Fire Hazard Class "C" per NFPA 45)
General Storage
Central Mechanical Room
Trash Room

- (d) Sprinkler design criteria for the various hazard classifications is noted below:

(1) Light Hazard sprinkler criteria will be designed to provide a water discharge density of 4.07 Liters/minute/square meter over the hydraulically most remote 279 square meters with a maximum sprinkler spacing of 20.9 square meters per sprinkler. Hose stream allowance will be 1,893 Liters /minute for a duration of 45 minutes.

(2) Ordinary Hazard Group 1 systems will be designed to provide a water discharge density of 4.7 Liters/minute per square meter over the hydraulically most remote 279 square meters with a maximum sprinkler spacing

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of 12 square meters per sprinkler. Hose stream allowance will be 1,893 Liters/minute for a duration of 60 minutes.

(3) Ordinary Hazard Group 2 will be designed to provide a water discharge density of 8.14 Liters/minute per square meter over the hydraulically most remote 279 square meters with a maximum sprinkler spacing of 12 square meters per sprinkler. Hose stream allowance will be 1,893 Liters/minute for a duration of 75 minutes.

1.1.2. Separation of Structures

1.1.2.1. Exposure Classification

The building construction is a one-story structure separated from all other buildings by more than 12.21 meters. Therefore, the exterior walls will be non-rated, non-combustible construction. (Reference Table 5/A/UBC.)

1.1.3. Fire Fighting Support

The building will be fully sprinklered with a wet pipe sprinkler system as required by Paragraph 4.4.5/MIL-HDBK-1008C. The sprinkler system will be installed in accordance with the requirements of Section 7-7/NFPA 101 and NFPA 13.

Fire alarm system is required and shall be in accordance with Section 01007.

Portable fire extinguisher suitable for Class "A" fires will be laid out in accordance with Table 3-2.1, NFPA 10 for the appropriate hazard occupancy. The fire extinguisher cabinets will be fully recessed type in all finish areas. Fire extinguishers are to be Contractor furnished and installed.

See subsequent paragraphs of this Fire Protection section for additional information regarding fire suppression, detection, and other aspects of fire fighting support.

1.2. FUNCTIONAL AND TECHNICAL REQUIREMENTS

1.2.1. Construction for Fire Resistances of the Building Including Roofs, Walls, and Doors

1.2.1.1. Building Construction Type

The Clinic will be Construction Type II-N/Uniform Building Code (UBC) in accordance with the requirements of Paragraph 4.4.2(b)/MIL-HDBK-1008C. The fire resistance requirements for Type II-N construction will comply with Section 603 and Table 6-A of the UBC.

1.2.1.2. Exterior Walls

Exterior walls of the facilities shall be non-rated and non-combustible as long as minimum distances from other buildings are maintained.

1.2.1.3. Roof

The building roof covering shall be Factory Mutual Approved or classified by Underwriter's Laboratory as Class "B" roof system.

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1.2.1.4. Interior Walls

Interior walls shall be of non-combustible materials. Fire-rated walls, if any, are shown on the fire protection plan. Penetrations in any fire-rated wall must be sealed with a through penetration firestop material rated to match the respective fire rating of the wall.

1.2.2. Type of Occupancies, Occupant Loads, Exits, and Travel Distances to Exits

1.2.2.1. Occupancies

The facility shall be considered a Business occupancy in accordance with NFPA 101, Chapter 38.

1.2.2.2. Occupant Load

The occupant load calculated below and the exit capacity provided by the floor plans are provided below:

OCCUPANCY	AREA	OCC. LOAD PER PERSON SF	POPULATION	CALC. FACTOR LEVEL	EXITS REQ. LEVEL	PROV. LEVEL	POPULATIO N EXIT CAPACITY PROVIDED
BUSINESS	11,520	1/100	116	0.2	23.2"	144"	720

(Reference Chapter 38/NFPA 101.)

1.2.2.3. Means of Egress

Exit doors are provided around the perimeter of the building to meet the exit requirements based upon the exit calculations shown above.

The design incorporates the following egress parameters which meet or exceed the LSC requirements:

- The minimum width of all corridors is 1.5 meters in width.
- The minimum width of all single doors is 1 meter.
- The minimum width of each leaf on all double doors will be 1 meter.
- No deadend corridor exceeds 15.24 meters.
- No common path of travel exceeds 30.5 meters.
- The travel distance to an exit does not exceed 91.5 meters.

The means of egress will be illuminated in accordance with Section 5-8/LSC.

Emergency lighting will be provided in accordance with Section 5-9/LSC.

Means of egress will be marked in accordance with Section 5-10/LSC.

1.2.2.4. Allowable Floor Area and Building Height

The allowable floor area is unlimited for a Business occupancy building that is provided with an approved automatic sprinkler system throughout and surrounded by public ways or yards not less than 61 meters in width.

(Reference Paragraph 505.2/UBC). Therefore, it will not be necessary to

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have any area separation walls (reference Paragraph 504.6/UBC) in the building.

The facility is limited in height to one or two stories (reference Paragraph 505.2/NFPA 101).

1.2.3. Fire Extinguisher Cabinets

Portable fire extinguisher suitable for Class "A" fires will be laid out in accordance with Table 3-2.1, NFPA 10 for the appropriate hazard occupancy. The fire extinguisher cabinets will be fully recessed type in all finish areas. Fire extinguishers are to be Contractor furnished and installed.

1.2.4. Sprinkler Systems

The building will be fully sprinklered with a wet pipe sprinkler system as required by Paragraph 4.4.5/MIL-HDBK-1008C. The sprinkler system will be installed in accordance with the requirements of Section 7-7/NFPA 101 and NFPA 13.

(a) Sprinkler design criteria for the various hazard classifications listed in Paragraph 1.1.1.2 is noted below:

(1) Light Hazard sprinkler criteria will be designed to provide a water discharge density of 4.07 Liters/minute per square meter over the hydraulically most remote 279 square meters with a maximum sprinkler spacing of 20.9 square meters per sprinkler. Hose stream allowance will be 946 Liters/minute for a duration of 45 minutes.

(2) Ordinary Hazard Group 1 systems will be designed to provide a water discharge density of 6.10 per square meter over the hydraulically most remote 279 square meters with a maximum sprinkler spacing of 12 square meters per sprinkler. Hose stream allowance will be 1,893 Liters/minute for a duration of 60 minutes.

(3) Ordinary Hazard Group 2 will be designed to provide a water discharge density of 8.14 per square meter over the hydraulically most remote 279 square meters with a maximum sprinkler spacing of 12 square meters per sprinkler. Hose stream allowance will be 1,893 Liters/minute for a duration of 75 minutes.

(b) Special Sprinkler Requirements:

(1) Drip trays and sprinkler head cages will be provided in all computer rooms and communication rooms.

1.2.5. Fire Department Connections and Fire Hydrants

Fire Department connections for the sprinkler system(s) shall be provided with suitable all weather access for pumper apparatus within 46 meters, reference MIL-HDBK-1008C, Section 2.11.1. A minimum of one fire hydrant shall be located within 46 meters of the fire department connections, reference MIL-HDBK-1008C, Section 5.7.3.2 (a).

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1.2.6. Resistance to Interior Finishes and Materials to Flame Spread and Smoke Development

1.2.6.1. Interior Finishes

Interior finishes on walls and ceilings throughout the building will be Class A or Class B having a flame spread rating of less than 25 or 75, respectively. A smoke developed rating of less than 50 for Class A and 100 for Class B will be provided for interior finishes. Interior floor finish in the corridors and exits will be a minimum Class I, having a minimum critical radiant flux rating of 0.45 watts per square centimeter.

1.2.6.2. Cellular Plastics

Cellular Plastics shall not be used as interior wall and ceiling materials per MIL-HDBK-1008C, Section 2.7.

1.2.7. Fire Alarm System

Fire Alarm System is required in accordance with Section 01007.

1.3. DESIGN OBJECTIVES AND PROVISIONS

1.3.1. Zoning and Treatment of Each Potential Hazard

The building is fully sprinklered and fire-rated walls are not required anywhere in the facility.

1.3.2. Provision and Maintenance of an Unobstructed Emergency Egress System.

All corridor widths, clear space requirements relative to exit doors, etc., shall be in accordance with the Uniform Federal Accessibility Standards or ADA whichever is more stringent for unobstructed egress.

1.3.3. Means of Egress

Means of egress will be in compliance with NFPA 101. Maximum dead ends shall be as per NFPA 101 (LSC). (Reference Paragraph 1.2.2.3 of this specification section.)

1.3.4. Outside Exit Doors

Doors for outside exit doors shall swing in the direction of exit travel. Outside exit doors shall be 915 mm wide.

1.3.5. Required Fire Exits

Required fire exits from the building shall lead to a public way or to a clear safe area at a minimum distance of 23 meters from the building.

DESIGN AND CONSTRUCTION
MEDICAL/DENTAL CLINIC
SCHRIEVER AFB, CO
2. PART 2 NOT USED
3. PART 3 NOT USED

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SECTION 01040

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5/00; Rev 06/02

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SECTION 01040

AS-BUILT DRAWINGS
5/00; Rev 06/02

PART 1 GENERAL

1.1 DEFINITIONS

The definitions listed below form a part of this specification.

1.1.1 Red-Line Drawings

Contract drawings marked-up to show actual work performed to include necessary sketches, modification drawings, shop drawings and notes. Green ink is used to indicate work deleted from the contract. Red ink is used for additions and deviations from the contract.

1.1.2 As-Built Drawings

Professional finished electronic CADD files developed from the original contract drawings that include all of the information from the redline drawings and suitable for half-size reproduction.

1.1.3 Vellum Drawings

Drawings on erasable Vellum 20# similar or equal to Xerox Zero solvent vellum.

1.1.4 Black-Line Drawings

Paper drawings reproduced from electronic CADD files or high quality reproducible drawings.

1.1.5 Full-Size Drawings

841mm x 594mm size drawings with all details visually readable.

1.1.6 Half-Size Drawings

420mm x 297mm size drawings with all details visually readable.

1.1.7 Modification Circle

A circle with a horizontal line through the center. The top half will contain the letter "P" with the bottom half containing the Modification number. The lettering standard will be 120/6 WRICO or similar.

1.1.8 Mylar Drawings

Drawings on polyester film, 3 or 5 mil, similar or equal to K & E Stabilene.

1.1.9 Electronic CADD Files

Electronic CADD files are files saved on CD-ROM in accordance with appropriate CADD standard. The CADD standard will include level on/off

status, special characters, line wieghts, font, and size requirements.

1.2 GENERAL REQUIREMENTS

The work includes creation of electronic CADD files on AutoCADD 2002 for as-built drawings to accurately depict existing conditions of the project. As-Built Drawings will become the permanent record drawings of the construction. The Contractor is responsible for development of electronic CADD files in accordance with Omaha District CADD standards. Omaha District's CADD standards are located on the Omaha District's FTP site (<ftp://ftp.nwo.usace.army.mil/pub/ED/CADD/ae/standards/ACADstd.pdf>) for AutoCADD and (<ftp://ftp.nwo.usace.army.mil/pub/ED/CADD/ae/standards/Caddstd.PDF>) for Microstation. The Omaha District will furnish a CD of CAD (read-write) contract drawing files in the software language specified in paragraph Procedure below. This is the software language required by the Using Service. These drawing files shall be used to prepare required As-Built drawings. The As-Built drawings shall include all major features of the work and all details to the same level as the original contract set of drawings. All changes from the contract drawings, including but not limited to all deviations, additional information, and modifications to the contract. Where contract drawings or specifications allow for options, only the option selected and actually constructed shall be shown on the As-Built Drawings. Systems designed or enhanced by the Contractor such as HVAC control system, fire alarm system fire sprinkler system, irrigation sprinkler system, letters of clarification, shall be accurately and neatly recorded on the As-Built Drawings using the same symbols, terminology, and general quality as the original set of contract drawings. All sheets affected by a change shall be revised. The transmittal requirements for the As-built Drawings shall be shown as events on the Contractor prepared project schedule.

1.3 PAYMENT

In accordance with the clause "Payment Under Fixed - Price Construction Contracts", which provides for progress payments on estimates of work accomplished (which meets the standards of quality established under the contract), \$(number of drawings in accepted design package x \$250 per sheet) will be withheld from payment for the creation of As-Built drawings until the final as-built drawings are delivered to the Contracting Officer (including any necessary revisions and subject to the approval of the Contracting Officer).

1.4 TRANSMITTAL OF AS-BUILT DRAWINGS

1.4.1 Preliminary As-Built Drawings

The Contractor shall produce Preliminary As-Built Drawings indicating as-built conditions on AutoCADD (Version 2002) with "clouding". As-Built preparation process is provided in paragraph As-Built Preparation below. Preliminary drawings shall consist of 15 percent of total project drawings. These drawings shall be sheets used for the construction of this project (excludes Cover Sheet, Vicinity Map, Location Plan and Indexes). The As-Built CADD files which include all changes up to the time Preliminary Drawings shall be sent as stated below. The Contractor shall draw attention to all drawing changes by "clouding" the affected area. This "clouding" shall be accomplished on layer 63 of the drawing file. The Preliminary Drawings shall consist of one (1) set of CADD files on a CD-ROM and one (1) full-size set of the Black-Line Drawings. One (1) set of CADD

files on a CD-ROM shall be submitted to the Omaha District Office (ATTN: CENWO-ED-DI, Jim Janicek). One (1) full-size set of the Black-Line Drawings shall be submitted to the COR. Both documents shall be submitted three (3) weeks prior to the final acceptance inspection unless otherwise directed by the COR. The COR will notify the Contractor in writing of approval / disapproval. The Contractor shall not submit the Final Drawings until he receives the COR's letter approving the Preliminary Drawings.

1.4.2 Final As-Built Drawings

The Contractor shall produce Final As-Built Drawings on AutoCADD (Version 2002) without "clouding". As-Built preparation process is provided in paragraph As-Built Preparation below. The Final Drawings shall include all changes. The Final Drawings in the form of a CD-ROM shall be submitted to the COR and Omaha District Office (CENWO-ED-DI) no earlier than the day of acceptance of the project and no later than thirty (30) days after the date on the acceptance letter for the Preliminary Drawing unless otherwise directed by the COR. (Note: Final drawings shall not be forwarded to the customer. Corps of Engineers, Omaha District COR will forward to the customer after Quality Review.) Contractor shall submit one (1) set of CADD files on a CD-ROM to the Omaha District Office (ATTN: CENWO-ED-DI, Jim Janicek). Contractor shall send the following documents to the COR:

a) One (1) set of CADD files on CD-ROM (folder name containing as-built files shall be designated "AS-BUILTS" on each CD-ROM). Both CD case and CD-ROM shall contain the name of the project, location, specification number, and contract number, and words "As-Built Record Set"). The folder shall contain drawings, indexes and X-REF files related to all as-builts.

b) One (1) full-size set of red-lined hard copy drawings prepared by the Contractor during construction.

COR will forward one (1) full-size set of drawings along with CD-ROM to the customer.

1.4.3 As-Built Preparation

Both preliminary and final electronic as-built drawings shall be produced in accordance with the following process for AutoCADD drawings:

1.4.3.1 Not Used

1.4.3.2 For AutoCADD (*.DWG) Files

- a. When opened, the drawing shall be seen exactly as it should be plotted.
- b. The view shall be zoomed to fit the border.
- c. All information in the title block shall be filled in, including plot scale.
- d. The information in the title block shall be correct, including the design file name and the plot scale.
- e. All files shall reference an AutoCAD border supplied by the Omaha District.
- f. All unnecessary information outside the border shall be deleted.
- g. All files shall be purged.
- h. All xrefs shall be included in directory.
- i. All fonts used shall be included with the set, even if it is the standard AutoCAD fonts. Fonts are provided in paragraph Standard AutoCAD fonts.
- j. An ASCII text file shall be provided with the following information:

a brief history of how the files were created, reference file paths that should be added to MS_RFDIR, the name of your font resource file, the name and phone number of the person we need to contact if we have problems, and the version of AutoCAD used to create and/or work on the drawings.

k. Both the .ctb file and the .pc3 file shall be supplied.

l. Each sheet/design shall have its own file and file name.

1.4.3.3 Standard AutoCADD Fonts

ARCHSTYL.SHX	bgothl.ttf	cibt____.pfb
AU101S01.SHX	bgothm.ttf	cibt____.pfm
AU102S01.SHX	compi.ttf	cobt____.pfb
bigfont.shx	comsc.ttf	cobt____.pfm
bold.shx	dutch.ttf	copying.gs
complex.shx	dutchb.ttf	euro____.pfb
dim.shx	dutchbi.ttf	euro____.pfm
gothice.shx	dutcheb.ttf	eur____.pfb
gothicg.shx	dutchi.ttf	eur____.pfm
gothici.shx	monos.ttf	fontmap.bd
greekc.shx	monosb.ttf	fontmap.ps
greeks.shx	monosbi.ttf	outline
HELVETIC.SHX	monosi.ttf	par____.pfb
isocp.shx	stylu.ttf	par____.pfm
isocp2.shx	swiss.ttf	romb____.pfb
isocp3.shx	swissb.ttf	romb____.pfm
isocp4.shx	swissbi.ttf	romi____.pfb
isocp5.shx	swissbo.ttf	romi____.pfm
isocp6.shx	swissc.ttf	rom____.pfb
italic.shx	swisscb.ttf	rom____.pfm
italicc.shx	swisscbi.ttf	sasbo____.pfb
italict.shx	swisscbo.ttf	sasbo____.pfm
monotxt.shx	swissci.ttf	sasb____.pfb
MROMANS.SHX	swissck.ttf	sasb____.pfm
msimplex.shx	swisscki.ttf	saso____.pfb
outline.shx	swisscl.ttf	saso____.pfm
romanc.shx	swisscli.ttf	sas____.pfb
romand.shx	swisse.ttf	sas____.pfm
romans.shx	swisseb.ttf	suf____.pfb
romant.shx	swissek.ttf	suf____.pfm
scriptc.shx	swissel.ttf	teb____.pfb
scripts.shx	swissi.ttf	teb____.pfm
simplex.shx	swissk.ttf	tel____.pfb
special.shx	swisski.ttf	tel____.pfm
syastro.shx	swissko.ttf	te____.pfb
syap.shx	swissl.ttf	te____.pfm
symath.shx	swissli.ttf	uglyr.gsf
symeteo.shx	umath.ttf	
symusic.shx	vinet.ttf	
txt.shx		

1.5 PROCEDURE

The Contractor shall create a set of electronic Cadd files and full-size Red-Line Drawings to fully indicate As-Built conditions. The Red-Line Drawings shall be maintained at the site, in a current condition until the completion of the work and shall be available for review by the COR at all times. All as-built conditions shall be on the Red-Line Drawings within two (2) days after the work activity is completed or shall be entered on

the deficiency tracking system (see Section 01451A, CONTRACTOR QUALITY CONTROL). The Contractor shall not convert electronic drawing files from one software language to another (i.e. Microstation to AutoCADD or AutoCADD to Microstation).

1.6 TITLE BLOCKS

The contract number and the specification number (if available) shall be shown on all sheets. "RECORD DRAWING" shall be added below the title block on all sheets. All modifications to the contract shall be posted in ascending order. The top line of the revision box shall state "REVISED TO SHOW AS-BUILT CONDITIONS" and dated. All modifications to all plans, sections, or details, shall have a modification number placed in the revision box under column entitled "Symbol". The statement "GENERAL REVISIONS" may be used when applicable. The date to be added in the revision box for modifications is found in Block 3 of Form SF-30. Cover Sheet will have Contract Award Set changed to As-Built Record Set with month & year completed. Month and year completed will also go in the date box in the title block. There will be no separate dates.

1.7 PROCEDURES FOR POSTING MODIFICATION CHANGES TO DRAWINGS

Follow directions in the modification for posting descriptive changes.

A Modification Circle shall be placed at the location of each deletion.

The highest modification number on the sheet should be shown in the modification circle in the "DATE" and "DRAWING CODE" boxes of the title block.

For all new details or sections that are added to a drawing, place a Modification Circle by the detail or section title.

For changes to a drawing, place a Modification Circle by the title of the affected plan, section or detail titles (each location).

For changes to schedules on drawings, a Modification Circle shall be placed either by the schedule heading or by the change in the schedule.

The Modification Circle size shall be 1/2-inch diameter unless the area where circle is to be placed is crowded. Use smaller size circle for crowded areas.

1.8 WORD ABBREVIATIONS

Abbreviations shown on the abbreviation sheet shall be used to describe all work items. Additional word abbreviations, not found on the abbreviation sheet but necessary to describe the work, shall be properly identified and incorporated with the other standard word abbreviations.

1.9 LEGEND SHEETS

Symbols, which conflict with those on the original contract legend sheet, shall not be used. Additional symbols, properly identified, necessary to depict any additional work items, shall be added to the legend sheet or supplemental legend. Those projects that do not have legend sheets may use supplemental legends on each sheet where symbol is shown.

1.10 CONTRACTOR SHOP DRAWINGS

Contractor shop drawings, which supersede data on the contract plans and/or additional drawings, prepared by the Contractor, shall be incorporated into the As-Built Drawings. Design plans prepared by Contractor shall include the designer's name on the As-Built Drawings.

1.11 INDEXING OF DRAWINGS

If drawings are added to the portfolio of drawings to depict as-built conditions, the index of drawings shall be revised accordingly.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 GENERAL

As-Built drawings shall include as-built information to the same level of detail as shown on the original details, unless otherwise specified. The Contractor shall provide any additional full-size drawings as required to display all the details.

3.2 SITE WORK

3.2.1 Utilities

All utilities shall be shown whether active, inactive, shown on the original contract drawings, or found on-site. The type of utility, location, general direction, size, material make-up and depth shall be shown. The location and description of any utility line or other installations of any kind known to exist within the construction area shall be shown. The location shall include dimensions to permanent features.

3.2.2 Structures

Structures above and below ground shall be shown. The size, material make-up, location, height, and/or depth shall be shown. Manholes shall show rim elevation and invert elevations as applicable. Power poles shall show electrical equipment and voltage rating.

3.2.3 Grades

Grade or alignment of roads, structures, or utilities shall be corrected if any changes were made from the contract drawings. Elevations shall be corrected if changes were made in site grading.

3.3 STRUCTURAL

3.3.1 Steel

Shop drawings that deviate from the contract drawings shall be incorporated in the As-Built Drawings.

3.4 MECHANICAL

3.4.1 Ductwork

Ductwork shall be shown to reflect actual installation and duct size. Ductwork routing changes shall be shown.

3.4.2 Plumbing

Piping and fixtures shall be shown to reflect the type of material, size and the route or location.

3.5 ELECTRICAL

3.5.1 PANELS

All contract drawing panel schedules shall be revised to show as-built conditions. Home-run circuit designation on electrical drawings shall accurately correspond to the as-built panel schedules.

3.5.2 Controls

All control diagrams in contract drawings shall be revised to reflect as-built conditions, and setpoints.

-- End of Section --

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SECTION 01200

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5/00; Rev 01/02

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PART 2 NOT USED

PART 3 NOT USED

-- End of Section Table of Contents --

SECTION 01200

WARRANTY OF CONSTRUCTION
5/00; Rev 01/02

PART 1 GENERAL

1.1 WARRANTY OF CONSTRUCTION

(a) Foremost and in addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (i) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

(b) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

(c) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of--

(1) The Contractor's failure to conform to contract requirements;
or

(2) Any defect of equipment, material, workmanship, or design furnished by the Contractor.

(d) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause.

(e) The Contractor's warranty with respect to work restored, repaired or replaced will run for 1 year from the date of restoration, repair or replacement. This provision applies equally to all items restored, repaired, or replaced under paragraph (c) and (d) above.

(f) The Government will notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage. Repair work necessary to correct a warranty condition which arises to threaten the health or safety of personnel, the physical safety of property or equipment, or which impairs operations, habitability of living spaces, etc., will be performed by the Contractor on an immediate basis as directed verbally by the Government. Written verification will follow verbal instruction.

(g) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of verbal or written notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

(h) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--

(1) Obtain all warranties that would be given in normal commercial practice;

(2) Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and

(3) Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

(i) In the event the Contractor's warranty under paragraph (b) of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

(j) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

(k) This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

(l) The Prime Contractor shall designate a representative to attend and chair warranty meetings that will be held each month at the project site for the duration of the warranty period, with government and subcontractor personnel as necessary. The meeting shall review past warranty corrections and response times, open warranty items, up-coming scheduled corrections, site investigations, and other issues.

1.2 ADDITIONAL WARRANTY REQUIREMENTS

1.2.1 Performance Bond

(a) It is understood that the Contractor's Performance Bond will remain effective for one (1) year from the date of acceptance.

(b) If either the Contractor or his representative doesn't diligently pursue warranty work to completion, the contractor and surety will be liable for all costs. The Government, at its option, will either have the work performed by others or require the surety to have it done. Both direct and administrative costs will be reimbursable to the Government.

1.2.2 Pre-Warranty Conference

(a) Prior to contract completion and at a time designated by the Contracting Officer or his authorized representative, the Contractor shall meet with the Contracting Officer or his authorized representative to develop a mutual understanding with respect to the requirements of the Paragraph: WARRANTY OF CONSTRUCTION. Communication procedures for Contractor notification of warranty defects, priorities with respect to the type of defect and other

details deemed necessary by the Contracting Officer or his authorized representative for the execution of the construction warranty shall be established/reviewed at this meeting.

(b) In connection with these requirements and at the time of the Contractor's quality control completion inspection, the Contractor will furnish the name, telephone number and address of the service representative which is authorized to initiate and pursue warranty work action on behalf of the Contractor and surety. This single point of contact will be located within the local service area of the warranted construction, will be continuously available, and will be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any Contractual responsibilities in connection with the paragraph: WARRANTY OF CONSTRUCTION.

(c) Local service area is defined as the area in which the contractor or his representative can meet the response times as described in paragraph 1.2.4 and in any event shall not exceed 200 miles radius of the construction site.

1.2.3 Equipment Warranty Identification

The Contractor shall provide warranty identification tags on all mechanical and electrical equipment installed under this contract. Tags and installation shall be in accordance with the requirements of Paragraph: EQUIPMENT WARRANTY IDENTIFICATION TAGS.

1.2.4 Warranty Service Calls

The Contractor or his local service representative will respond to the site, to a call within the time periods as follows: Four (4) hours for Heating, Air Conditioning, Refrigeration, Air Supply and Distribution, Critical Electrical service Systems and Food Service Equipment and Twenty-Four (24) hours For All Other Systems.

1.2.5 Equipment Warranty Booklet

At or before 30 days prior to final inspection and acceptance of the work, the Contractor shall submit the data mentioned as follows:

The Contractor shall provided a Booklet, which consists of a listing of all equipment items (see paragraphs a. and b. below) which are specified to be guaranteed along with the warranty papers for each piece of equipment. Three (3) legible bound copies of the booklet shall be submitted for approval and shall be indexed alphabetically by equipment type. For each specific guaranteed item, the name, address, and telephone number shall be shown on the list for the subcontractor who installed equipment, equipment supplier or distributor, and equipment manufacturer. Completion date of the guarantee period shall correspond to the applicable specification requirements for each guaranteed item. The names of service representatives that will make warranty calls along with the day, night, weekend and holiday contacts for response to a call within the time period specified shall also be identified.

a. For Equipment in Place: The equipment list shall show unit retail value and nameplate data including model number, size, manufacturer, etc. This would include capital equipment and other nonexpendable supplies of a movable nature that are not affixed as an integral part of the facility and

may be removed without destroying or reducing the usefulness of the facility. Some examples are spare parts, special tools, manufacturing equipment, maintenance equipment, instruments, installed under this contract.

b. For Installed Building Equipment: The equipment list shall show unit retail value and nameplate data including model number, size, manufacturer, etc. This would include items of equipment and furnishings (including material for installation thereof), which are required to make the facility usable and are affixed as a permanent part of the structure. Some examples are plumbing fixtures, laboratory counters and cabinets, kitchen equipment, mechanical equipment, electrical equipment, and fire protection systems installed under this contract.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

Equipment Warranty Booklet

1.4 EQUIPMENT WARRANTY IDENTIFICATIONS TAGS

1.4.1 GENERAL REQUIREMENTS

The Contractor shall provide warranty identification tags on all Contractor and government furnished equipment which is Contractor installed.

1.4.1.1 Tags and Information

The tags and information shall be similar in format and size to the exhibits provided by this specification, and shall be suitable for interior and exterior locations, resistant to solvents, abrasion, and to fading caused by sunlight, precipitation, etc. These tags shall have a permanent pressure-sensitive adhesive back, and shall be installed in a position that is easily (or most easily) noticeable. If the equipment surface is not suitable for adhesive back, Contractor shall submit his alternative to the Contracting Officer's Authorized Representative for review and approval. Contractor furnished equipment that has differing warranties on its components will have each component tagged.

1.4.1.2 Tags for Warranted Equipment

The tag for his equipment shall be similar to the following:

EQUIPMENT WARRANTY	
CONTRACTOR FURNISHED EQUIPMENT	
MFG-----	MODEL NO.-----
SERIAL NO.-----	

CONTRACT NO.-----
CONTRACTOR NAME-----
CONTRACTOR ADDRESS-----
CONTRACTOR TELEPHONE-----
CONTRACTOR WARRANTY EXPIRES-----
IN CASE OF WARRANTY ACTION FIRST CONTACT
[DEH] [BCE] AT [TELEPHONE NUMBER]

EQUIPMENT WARRANTY	
GOVERNMENT FURNISHED EQUIPMENT	
MFG _____	MODEL NO. _____
SERIAL NO. _____	
CONTRACT NO. _____	
DATE EQUIP PLACED IN SERVICE _____	

1.4.1.3 Exclusion to Providing Tags

If the manufacturer's name (MFG), model number and serial number are on the manufacturer's equipment data plate and this data plate is easily found and fully legible, this information need not be duplicated on the equipment warranty tag. The Contractor's warranty expiration date and the final manufacturer's warranty expiration date will be determined as specified by the Paragraph "WARRANTY OF CONSTRUCTION".

1.4.2 EXECUTION

The Contractor will complete the required information on each tag and install these tags on the equipment by the time of and as a condition of final acceptance of the equipment. The Contractor shall be responsible for scheduling acceptance inspection with the Contracting Officer (verbal and written notification required). If this inspection is delayed by the Contractor, the Contractor shall, at his own expense, update the in-service and warranty expiration dates on these tags.

1.4.3 Equipment Warranty Tag Replacement

Under the terms of this contract, the Contractor's warranty with respect to work repaired or replaced shall run for one year from the date of repair or replacement. Such activity shall include a data warranty identification tag on the repaired or replaced equipment. The tag shall be furnished and

installed by the Contractor, and shall be similar to the original tag, except that it should include the scope of repair and that the contractor's warranty expiration date will be one year from the date of acceptance of the repair or replacement. In the case of repair, the repair only will be covered by the extended warranty. In the case of replacement of a component, the component only will be covered by the extended warranty. In these cases, the original tags will not be removed, but an additional tag will be installed for the repair or component replacement.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

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SECTION 01320A

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SECTION 01320A

PROJECT SCHEDULE
08/01; Omaha Rev. 10/01

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of the specification to the extent referenced. The publications are referenced in the text by basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

ER 1-1-11 (1995) Progress, Schedules, and Network
Analysis Systems

1.2 QUALIFICATIONS

The Contractor shall designate an authorized representative who shall be responsible for the preparation of all required project schedule reports.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS, a Project Schedule as described below shall be prepared. The scheduling of construction shall be the responsibility of the Contractor. Contractor management personnel shall actively participate in its development. Subcontractors and suppliers working on the project shall also contribute in developing and maintaining an accurate Project Schedule. The approved Project Schedule shall be used to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of all progress payments. The scheduler shall be a direct employee of the prime contractor and have a minimum of 2 years experience in scheduling.

3.2 BASIS FOR PAYMENT

The schedule shall be the basis for measuring Contractor progress. Lack of an approved schedule or scheduling personnel will result in an inability of the Contracting Officer to evaluate Contractor's progress for the purposes of payment. Failure of the Contractor to provide all information, as specified below, shall result in the disapproval of the entire Project Schedule submission and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. In the case where Project Schedule revisions have been directed by the Contracting Officer and those revisions have not been included in the Project Schedule, the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until revisions to the Project Schedule have been made.

3.3 PROJECT SCHEDULE

The computer software system utilized by the Contractor to produce the Project Schedule shall be capable of providing all requirements of this specification. Failure of the Contractor to meet the requirements of this specification shall result in the disapproval of the schedule. Manual methods used to produce any required information shall require approval by the Contracting Officer.

3.3.1 Use of the Critical Path Method

The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The Contractor shall provide the Project Schedule in the Precedence Diagram Method (PDM).

3.3.2 Level of Detail Required

The Project Schedule shall include an appropriate level of detail. Failure to develop or update the Project Schedule or provide data to the Contracting Officer at the appropriate level of detail, as specified by the Contracting Officer, shall result in the disapproval of the schedule. The Contracting Officer will use, but is not limited to, the following conditions to determine the appropriate level of detail to be used in the Project Schedule:

3.3.2.1 Activity Durations

Contractor submissions shall follow the direction of the Contracting Officer regarding reasonable activity durations. Reasonable durations are those that allow the progress of activities to be accurately determined between payment periods (usually less than 2 percent of all non-procurement activities' Original Durations are greater than 20 days).

3.3.2.2 Procurement Activities

Tasks related to the procurement of long lead materials or equipment shall be included as separate activities in the project schedule. Long lead materials and equipment are those materials that have a procurement cycle of over 90 days. Examples of procurement process activities include, but are not limited to: submittals, approvals, procurement, fabrication, and delivery.

3.3.2.3 Critical Activities

The following activities shall be listed as separate line activities on the Contractor's project schedule:

- a. Submission and approval of mechanical/electrical layout drawings.
- b. Submission and approval of O & M manuals.
- c. Submission and approval of as-built drawings.
- d. Submission and approval of 1354 data and installed equipment lists.
- e. Submission and approval of testing and air balance (TAB).
- f. Submission of TAB specialist design review report.

- g. Submission and approval of fire protection specialist.
- h. Submission and approval of testing and balancing of HVAC plus commissioning plans and data.
- i. Air and water balance dates.
- j. HVAC commissioning dates.
- k. Controls testing plan.
- l. Controls testing.
- m. Performance Verification testing.
- n. Other systems testing, if required.
- o. Prefinal inspection.
- p. Correction of punchlist from prefinal inspection.
- q. Final inspection.

3.3.2.4 Government Activities

Government and other agency activities that could impact progress shall be shown. These activities include, but are not limited to: approvals, inspections, utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

3.3.2.5 Responsibility

All activities shall be identified in the project schedule by the party responsible to perform the work. Responsibility includes, but is not limited to, the subcontracting firm, contractor work force, or government agency performing a given task. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by the Responsibility Code.

3.3.2.6 Work Areas

All activities shall be identified in the project schedule by the work area in which the activity occurs. Activities shall not be allowed to cover more than one work area. The work area of each activity shall be identified by the Work Area Code.

3.3.2.7 Modification or Claim Number

Any activity that is added or changed by contract modification or used to justify claimed time shall be identified by a mod or claim code that changed the activity. Activities shall not belong to more than one modification or claim item. The modification or claim number of each activity shall be identified by the Mod or Claim Number. Whenever possible, changes shall be added to the schedule by adding new activities. Existing activities shall not normally be changed to reflect modifications.

3.3.2.8 Bid Item

All activities shall be identified in the project schedule by the Bid Item

to which the activity belongs. An activity shall not contain work in more than one bid item. The bid item for each appropriate activity shall be identified by the Bid Item Code.

3.3.2.9 Phase of Work

All activities shall be identified in the project schedule by the phases of work in which the activity occurs. Activities shall not contain work in more than one phase of work. The project phase of each activity shall be by the unique Phase of Work Code.

3.3.2.10 Category of Work

All Activities shall be identified in the project schedule according to the category of work which best describes the activity. Category of work refers, but is not limited, to the procurement chain of activities including such items as submittals, approvals, procurement, fabrication, delivery, installation, start-up, and testing. The category of work for each activity shall be identified by the Category of Work Code.

3.3.2.11 Feature of Work

All activities shall be identified in the project schedule according to the feature of work to which the activity belongs. Feature of work refers, but is not limited to, a work breakdown structure for the project. The feature of work for each activity shall be identified by the Feature of Work Code.

3.3.3 Scheduled Project Completion

The schedule interval shall extend from NTP to the contract completion date.

3.3.3.1 Project Start Date

The schedule shall start no earlier than the date on which the NTP was acknowledged. The Contractor shall include as the first activity in the project schedule an activity called "Start Project". The "Start Project" activity shall have an "ES" constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

3.3.3.2 Constraint of Last Activity

Completion of the last activity in the schedule shall be constrained by the contract completion date. Calculation on project updates shall be such that if the early finish of the last activity falls after the contract completion date, then the float calculation shall reflect a negative float on the critical path. The Contractor shall include as the last activity in the project schedule an activity called "End Project". The "End Project" activity shall have an "LF" constraint date equal to the completion date for the project, and a zero day duration.

3.3.3.3 Early Project Completion

In the event the project schedule shows completion of the project prior to the contract completion date, the Contractor shall identify those activities that have been accelerated and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. Contractor shall specifically address each of the activities noted in the narrative report at every project schedule update period to assist the Contracting Officer in evaluating the Contractor's ability to actually

complete prior to the contract period.

3.3.4 Interim Completion Dates

Contractually specified interim completion dates shall also be constrained to show negative float if the early finish date of the last activity in that phase falls after the interim completion date.

3.3.4.1 Start Phase

The Contractor shall include as the first activity for a project phase an activity called "Start Phase X" where "X" refers to the phase of work. The "Start Phase X" activity shall have an "ES" constraint date equal to the date on which the NTP was acknowledged, and a zero day duration.

3.3.4.2 End Phase

The Contractor shall include as the last activity in a project phase an activity called "End Phase X" where "X" refers to the phase of work. The "End Phase X" activity shall have an "LF" constraint date equal to the completion date for the project, and a zero day duration.

3.3.4.3 Phase X

The Contractor shall include a hammock type activity for each project phase called "Phase X" where "X" refers to the phase of work. The "Phase X" activity shall be logically tied to the earliest and latest activities in the phase.

3.3.5 Default Progress Data Disallowed

Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual Start and Finish dates on the CPM schedule shall match those dates provided from Contractor Quality Control Reports. Failure of the Contractor to document the Actual Start and Finish dates on the Daily Quality Control report for every in-progress or completed activity, and failure to ensure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the Contractor's schedule and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. Updating of the percent complete and the remaining duration of any activity shall be independent functions. Program features which calculate one of these parameters from the other shall be disabled.

3.3.6 Out-of-Sequence Progress

Activities that have posted progress without all preceding logic being satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case approval of the Contracting Officer. The Contractor shall propose logic corrections to eliminate all out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule.

3.3.7 Negative Lags

Lag durations contained in the project schedule shall not have a negative value.

3.4 PROJECT SCHEDULE SUBMISSIONS

The Contractor shall provide the submissions as described below. The data disk, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS.

3.4.1 Preliminary Project Schedule Submission

The Preliminary Project Schedule, defining the Contractor's planned operations for the first 60 calendar days shall be submitted for approval within 20 calendar days after the NTP is acknowledged. The approved preliminary schedule shall be used for payment purposes not to exceed 60 calendar days after NTP.

3.4.2 Initial Project Schedule Submission

The Initial Project Schedule shall be submitted for approval within 40 calendar days after NTP. The schedule shall provide a reasonable sequence of activities which represent work through the entire project and shall be at a reasonable level of detail.

3.4.3 Monthly Schedule Updates

Based on the result of progress meetings, specified in "Monthly Progress Meetings," the Contractor shall submit monthly schedule updates. These submissions shall enable the Contracting Officer to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgement of the Contracting Officer or authorized representative is necessary for verifying the Contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made.

3.4.4 Standard Activity Coding Dictionary

The Contractor shall use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11, Appendix A. This exact structure is mandatory, even if some fields are not used.

3.5 SUBMISSION REQUIREMENTS

The following items shall be submitted by the Contractor for the preliminary submission, initial submission, and every monthly project schedule update throughout the life of the project:

3.5.1 Data Disks

Two data disks containing the project schedule shall be provided. Data on the disks shall adhere to the SDEF format specified in ER 1-1-11, Appendix A.

3.5.1.1 File Medium

Required data shall be submitted on 3.5 disks, formatted to hold 1.44 MB of data, compatible with Microsoft Windows 95/98 operating systems, unless otherwise approved by the Contracting Officer.

3.5.1.2 Disk Label

A permanent exterior label shall be affixed to each disk submitted. The

label shall indicate the type of schedule (Preliminary, Initial, Update, or Change), full contract number, project name, project location, data date, name and telephone number or person responsible for the schedule.

3.5.1.3 File Name

Each file submitted shall have a name related to either the schedule data date, project name, or contract number. The Contractor shall develop a naming convention that will ensure that the names of the files submitted are unique. The Contractor shall submit the file naming convention to the Contracting Officer for approval.

3.5.2 Narrative Report

A Narrative Report shall be provided with the preliminary, initial, and each update of the project schedule. This report shall be provided as the basis of the Contractor's progress payment request. The Narrative Report shall include: a description of activities along the 2 most critical paths, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. The narrative report is expected to relay to the Government, the Contractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through that analysis.

3.5.3 Approved Changes Verification

Only project schedule changes that have been previously approved by the Contracting Officer shall be included in the schedule submission. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

3.5.4 Schedule Reports

The format for each activity for the schedule reports listed below shall contain: Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float. Actual Start and Actual Finish Dates shall be printed for those activities in progress or completed.

3.5.4.1 Activity Report

A list of all activities sorted according to activity number.

3.5.4.2 Logic Report

A list of Preceding and Succeeding activities for every activity in ascending order by activity number. Preceding and succeeding activities shall include all information listed above in paragraph Schedule Reports. A blank line shall be left between each activity grouping.

3.5.4.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. Activities which have the same amount of total float shall be listed in ascending order of Early Start Dates. Completed activities shall not be shown on this report.

3.5.4.4 Earnings Report

A compilation of the Contractor's Total Earnings on the project from the NTP until the most recent Monthly Progress Meeting. This report shall reflect the Earnings of specific activities based on the agreements made in the field and approved between the Contractor and Contracting Officer at the most recent Monthly Progress Meeting. Provided that the Contractor has provided a complete schedule update, this report shall serve as the basis of determining Contractor Payment. Activities shall be grouped by bid item and sorted by activity numbers. This report shall: sum all activities in a bid item and provide a bid item percent; and complete and sum all bid items to provide a total project percent complete. The printed report shall contain, for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), and Earnings to Date.

3.5.5 Network Diagram

The network diagram shall be required on the initial schedule submission and on monthly schedule update submissions. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.5.1 Continuous Flow

Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity number, description, duration, and estimated earned value shall be shown on the diagram.

3.5.5.2 Project Milestone Dates

Dates shall be shown on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.5.3 Critical Path

The critical path shall be clearly shown.

3.5.5.4 Banding

Activities shall be grouped to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

3.5.5.5 S-Curves

Earnings curves showing projected early and late earnings and earnings to date.

3.6 PERIODIC PROGRESS MEETINGS

Progress meetings to discuss payment shall include a monthly onsite meeting or other regular intervals mutually agreed to at the preconstruction conference. During this meeting the Contractor shall describe, on an activity by activity basis, all proposed revisions and adjustments to the project schedule required to reflect the current status of the project. The Contracting Officer will approve activity progress, proposed revisions,

and adjustments as appropriate.

3.6.1 Meeting Attendance

The Contractor's Project Manager and Scheduler shall attend the regular progress meeting.

3.6.2 Update Submission Following Progress Meeting

A complete update of the project schedule containing all approved progress, revisions, and adjustments, based on the regular progress meeting, shall be submitted not later than 4 working days after the monthly progress meeting.

3.6.3 Progress Meeting Contents

Update information, including Actual Start Dates, Actual Finish Dates, Remaining Durations, and Cost-to-Date shall be subject to the approval of the Contracting Officer. As a minimum, the Contractor shall address the following items on an activity by activity basis during each progress meeting.

3.6.3.1 Start and Finish Dates

The Actual Start and Actual Finish dates for each activity currently in-progress or completed .

3.6.3.2 Time Completion

The estimated Remaining Duration for each activity in-progress. Time-based progress calculations shall be based on Remaining Duration for each activity.

3.6.3.3 Cost Completion

The earnings for each activity started. Payment will be based on earnings for each in-progress or completed activity. Payment for individual activities will not be made for work that contains quality defects. A portion of the overall project amount may be retained based on delays of activities.

3.6.3.4 Logic Changes

All logic changes pertaining to NTP on change orders, change orders to be incorporated into the schedule, contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, lag durations, and other changes that have been made pursuant to contract provisions shall be specifically identified and discussed.

3.6.3.5 Other Changes

Other changes required due to delays in completion of any activity or group of activities include: 1) delays beyond the Contractor's control, such as strikes and unusual weather. 2) delays encountered due to submittals, Government Activities, deliveries or work stoppages which make re-planning the work necessary. 3) Changes required to correct a schedule which does not represent the actual or planned prosecution and progress of the work.

3.7 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests an extension of the contract completion date, or any interim milestone date, the Contractor shall furnish the following for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract: justification, project schedule data, and supporting evidence as the Contracting Officer may deem necessary. Submission of proof of delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is obligatory to any approvals.

3.7.1 Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request.

The Contracting Officer's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information. Actual delays that are found to be caused by the Contractor's own actions, which result in the extension of the schedule, will not be a cause for a time extension to the contract completion date.

3.7.2 Submission Requirements

The Contractor shall submit a justification for each request for a change in the contract completion date of under 2 weeks based upon the most recent schedule update at the time of the NTP or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

- a. A list of affected activities, with their associated project schedule activity number.
- b. A brief explanation of the causes of the change.
- c. An analysis of the overall impact of the changes proposed.
- d. A sub-network of the affected area.

Activities impacted in each justification for change shall be identified by a unique activity code contained in the required data file.

3.7.3 Additional Submission Requirements

For any requested time extension of over 2 weeks, the Contracting Officer may request an interim update with revised activities for a specific change request. The Contractor shall provide this disk within 4 days of the Contracting Officer's request.

3.8 DIRECTED CHANGES

If the NTP is issued for changes prior to settlement of price and/or time, the Contractor shall submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The proposed revisions to the schedule will be approved by the Contracting Officer prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor with suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until revisions are submitted, and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions

furnished by the Contracting Officer, the Contractor shall advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

3.9 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

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SECTION 01330

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SECTION 01330

SUBMITTAL PROCEDURES
09/01; Omaha Update 07/02

PART 1 GENERAL

Attachments: Submittal Register
ENG Form 4025, Transmittal Form

1.1 SUMMARY

This section includes administrative and procedural requirements for construction submittals presented by the Contractor after 100% corrected plans and specifications have been accepted by the government. This section also includes requirements for developing, submitting and maintaining a "Submittal Register".

1.2 CONTRACTOR RESPONSIBILITIES

The Contractor is responsible for total management of his work including approval, scheduling, control, and certification of all submittals. The submittal management system provided in these specifications is intended to be a complete system for the Contractor to use to control the quality of materials, equipment and workmanship provided by manufacturers, fabricators, suppliers and subcontractors. The Contractor shall review each submittal for contract compliance. The Submittal Register (ENG Form 4288) will be utilized to log and monitor all submittal activities. No construction or installation activities shall be performed prior to required approvals and Government compliance reviews of applicable submittals. The Contractor shall perform a check to assure that all materials and/or equipment have been tested, submitted and approved during the preparatory phase of quality control inspections. The Contractor shall coordinate all submittals with the Contractor's Designer (A-E). Approval by the Contractor's Designer means that the submittal is in compliance with the Construction Set design submittal.

1.3 SUBMITTAL IDENTIFICATION (SD)

Submittals required are identified by SD numbers and titles as follows:

SD-01 Preconstruction Submittals

Tabular lists showing location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

In addition, the following items are included:

Construction Progress Schedule
Health and safety plan
Work plan

Quality control plan
Environmental protection plan
Permits

SD-02 Shop Drawings

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, details of fabrication, layouts of particular elements, connections, and other relational aspects of the work.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Samples, including both fabricated and unfabricated physical examples of materials, products, and units of work as complete units or as portions of units of work.

Physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged. Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

Calculations, mix designs, analyses or other data pertaining to a part of work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accordance with specified requirements. (Testing must have been within three years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports

Daily checklists

Final acceptance test and operational test procedure

SD-07 Certificates

A document, required of the Contractor, or through the Contractor, from a supplier, installer, manufacturer, or other lower tier Contractor, the purpose of which is to confirm the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verifications of quality.

Statement signed by an official authorized to certify on behalf of the manufacturer of a product, system or material, attesting that the product, system or material meets specified requirements. The statement must be dated after the award of the contract, must state the Contractor's name and address, must name the project and location, and must list the specific requirements which are being certified.

Confined space entry permits.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and material safety data sheets, if any, concerning impedances, hazards, and safety precautions.

SD-09 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

Factory test reports.

SD-10 Operation and Maintenance Data

Data intended to be incorporated in operations and maintenance manuals.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

In addition, the following items are included:

As-built drawings

Special warranties

Posted operating instructions

Training plan

1.4 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.4.1 Designer Approved ("G-AE")

Designer approval is required for extensions of design, critical materials, deviations, any deviations from the solicitation, the accepted proposal, or the completed design, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings." All submittals noted in the technical specifications and Submittal Register as "G-AE" are subject to approval by the Contractor's Designer, prior to submittal to the Government. The Contracting Officer has the option to review any submittal. The Government will review all "G-AE" submittals for conformance to the solicitation and all submittals designated as variations from the Solicitation or 100% corrected design or as directed by the Contracting Officer.

1.4.2 Government Reviewed Construction Submittals ("G-RE")

"G-RE" submittals subject to Government review are those so designated by the Contracting Officer during the design process or preconstruction meeting. All "G-RE" submittals shall be reviewed and approved by the Contractor's Quality Control Representative and the Contractor's Designer prior to submittal to the Government. Within the terms of the Contract Clause entitled "Specification and Drawings for Construction," they are considered to be "shop drawings." Any variance must clearly identify the variance as specified in paragraph: "Variations", below.

Government review is required for designated "G-RE" submittals and variations from the the solicitation requirements and completed design. Review will be only for conformance with the contract requirements. This also includes those construction submittals for which the design documents did not include enough detail to ascertain contract compliance. Government review will not include development of design calculations or other means of determining adequacy of design. The Contractor and his designer retains the sole responsibility for adequacy of design.

1.4.3 Information Only (FIO)

All "FIO" submittals shall be reviewed and approved by the Contractor's Quality Control Representative and the Contractor's Designer prior to submittal to the Government. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above. The Contracting Officer has the option to review any submittal.

1.5 GOVERNMENT REVIEWED SUBMITTALS

The Contracting Officer's review of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information appear to meet the Solicitation requirements. Government Review will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Design and CQC requirements of this contract is responsible for design, compliance with design criteria required in the solicitation, dimensions, all design extensions, such as the design of adequate connections and details, etc. and the satisfactory construction of all work. After submittals have been reviewed for conformance or approval, as applicable, by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.6 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer, obtain the Contractor's Designer approval and Government review, or approval, when applicable, and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. Any submittal found to contain errors or unapproved variations from the solicitation or accepted proposal, shall be resubmitted as one requiring "approval" action, requiring both Designer's approval and Government conformance review or approval, as applicable. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

1.7 WITHHOLDING OF PAYMENT

No Payment for materials incorporated in the work will be made if all required Designer or Contractor Quality Control Representative approvals or required Government conformance reviews, or approvals, as applicable, have not been obtained. No payment will be made for any materials incorporated in the work for any conformance review submittals or information only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

1.8 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. The Contractor's Quality Control (CQC) representative, and the Designer, as applicable, shall check, approve and stamp, sign, and date each item, indicating action taken. Proposed variations from the solicitation (contract requirements) or accepted 100% corrected design shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring conformance review or approval by the Government shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

1.9 SUBMITTAL REGISTER AND ENG FORM 4288 (RMS) SUBMITTAL REGISTER

The Contractor's Designer(s) shall develop a complete list of submittals during design. The Designer shall identify required submittals in the specifications. The list is to be used in preparing Submittal Register as approved by the Contracting Officer Representative. The example Submittal Register furnished with the Solicitation was created using Specsintact Software. The Contractor shall replace this example Submittal Register with the actual submittal register for the completed design specifications. The list is not all inclusive and additional submittals may be required. The attached and Contractor generated submittal register identifies only the submittal section, type of submittal, description of item submitted, paragraph number related to submittal item (section submittal paragraph if none listed), submittal classification (G), and submittal reviewer identifier (AE or RE). Any submittal without a submittal classification and submittal reviewer identifier is considered to be For Information Only (FIO). The submittal register generated by the Government Resident Management System (RMS) Software is used for tracking construction submittals and is referred to as ENG Form 4288 (RMS). Much of the same information contained on the Contractor generated submittal register will be included on the ENG Forms 4288 (RMS). The Contractor shall maintain a ENG Form 4288 (RMS) for the project in accordance with the attached ENG Form 4288 (RMS) Instructions. The Contractor will be furnished one (1) set of ENG Forms 4288 (RMS) at the preconstruction conference on which will be listed each item of equipment and material of each type for which fabricators' drawings, and/or related descriptive data, test reports, samples, spare parts lists, O&M manuals, or other types of submittals are required by the completed project specifications. The Contractor shall complete the appropriate columns as indicated on the attached ENG Form 4288 (RMS) Instructions and return six (6) completed copies to the Contracting Officer for acceptance within 20 calendar days after the preconstruction conference. Upon acceptance of the ENG Form 4288 (RMS) by the Contracting Officer, the ENG Form 4288 (RMS) will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period. The ENG Form 4288 (RMS) ACTIVITY NO. is filled in when a network analysis system is a contract requirement. The TRANSMITTAL NO. and ITEM NO. shall be left blank and used later to record the respective transmittal and item number corresponding to those listed on the transmittal form entitled: "TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE" (ENG Form 4025). The approved ENG Form 4288 (RMS) will become the scheduling document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated. Updates to the submittal register showing the Contractor action codes and actual dates shall be submitted monthly or until all submittals have been satisfactorily completed. When the progress schedule is revised, the ENG Form 4288 (RMS) shall also be revised and both submitted for approval.

1.10 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 20 calendar days exclusive of mailing time) shall be allowed and shown on the register for conformance reviews by the Contracting Officer for submittals requiring Government review and for submittals which vary from the solicitation or

accepted 100% corrected design. No delay damages or time extensions will be allowed for time lost in late submittals. .

1.11 TRANSMITTAL FORM (ENG FORM 4025)

The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting all submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

1.12 SUBMITTAL PROCEDURES

Submittals shall be made as follows:

1.12.1 Procedures

1.12.1.1 "G-AE" Submittals

All "G-AE" submittals shall be reviewed and approved by the Contractor's Quality Control Representative and Contractor's Designer prior to submittal to the Government. A conformance review is required by the Government on all "G-AE" submittals, prior to construction of the related items.

Except as noted below, data for all items listed as "G-AE" Submittals in the various sections shall be submitted in seven (7) copies). All seven (7) copies shall be submitted to the Area Engineer using the transmittal form. Items not to be submitted in multiples, such as samples and test cylinders, shall be submitted to the Area or Resident Engineer (as directed), accompanied by seven (7) copies of the transmittal form.

Each required submittal, which is in the form of a drawing, shall be submitted as seven (7) prints of the drawing. Drawing prints shall be either blue or black line permanent-type prints on a white background or blueprint and shall be sufficiently clear and suitable for making legible copies.

Catalog cuts and other descriptive data which have more than one model, size, or type or which shows optional equipment shall be clearly marked to show the model, size, or type and all optional equipment which is provided.

Submittals on component items forming a system or that are interrelated shall be submitted at one time as a single submittal in order to demonstrate that the items have been properly coordinated and will function as a unit.

An additional copy of reviewed and approved submittals related to fire protection/detection systems shall be submitted to the Base Civil Engineering Office. The mailing address for these submittals shall be obtained at the preconstruction conference.

1.12.1.2 "G-RE" and FIO Submittals

Except as noted below, data for all items listed as "G-RE" Submittals in the various sections shall be submitted in five (5) copies. All five

copies shall be submitted to the Area Engineer for solicitation conformance review using the transmittal form. Items not to be submitted in multiples, such as samples and test cylinders, shall be submitted to the Area or Resident Engineer (as directed) accompanied by five (5) copies of the transmittal form.

Except as noted below, data for all items listed as "FIO" Submittals in the various sections shall be submitted in three (3) copies. All three copies shall be submitted to the Area Engineer using the transmittal form. Items not to be submitted in multiples, such as samples and test cylinders, shall be submitted to the Area or Resident Engineer (as directed) accompanied by three (3) copies of the transmittal form.

All "G-RE" and "FIO" submittals shall be reviewed and approved by the Contractor's Quality Control Representative and Contractor's Designer prior to submittal to the Government. A completed Government conformance review is required on all "G-RE" submittals, prior to construction of the related items.

The Government has the option to review any For Information Only submittals.

1.12.1.3 Base Civil Engineering Office Submittals

An additional copy of submittals related to the following systems: All interior finishes (i.e. carpet, BB court flooring, wallcovering, paint, laminates, etc.), All exterior finishes (i.e. stone, metal panels, storefront, glazing, etc.), All equipment Operation and Maintenance Manuals, Testing and balancing reports (HVAC, electrical, cathodic protection, and fire detection alarm), BB Goals and standards, BB Court lighting, DDC/EMCS Controls, Fire Protection System, Fire Detection System, and Telephone System Wiring Schematic shall be submitted concurrently to the Base Civil Engineering Office for their information. The mailing address for these submittals shall be obtained at the preconstruction conference.

1.12.1.4 Certificates of Compliance

Each certificate shall be signed by an official authorized to certify in behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

1.12.1.5 Purchase Orders

Copies of purchase orders shall be furnished to the Contracting Officer when the Contractor requests assistance for expediting deliveries of equipment or materials, or when requested by the Contracting Officer for the purpose of quality assurance review. Each purchase order issued by the Contractor or his subcontractors for materials and equipment to be incorporated into the project shall (1) be clearly identified with the applicable DA contract number, (2) carry an identifying number, (3) be in sufficient detail to identify the material being purchased, (4) indicate a definite delivery date, and (5) display the DMS priority rating, if

applicable.

1.12.1.6 Operation and Maintenance Instructions and/or Manuals

Where required by various technical sections, operations and maintenance instructions and/or manuals with parts lists included shall be provided by the Contractor in quintuplicate, unless otherwise specified, and shall be assembled in three-ring binders with index and tabbed section divider and having a cover indicating the contents by equipment or system name and project title and shall be submitted to the Area Engineer for approval (after approval by the Contractor's Quality Control Representative), 90 days prior to final tests of mechanical and electrical systems, unless otherwise specified. Each operation and maintenance manual shall contain a copy of all warranties. If field testing requires these copies to be revised, they shall be updated and resubmitted for review within 10 calendar days after completion of tests.

1.12.1.7 Interior/Exterior Finish Sample and Data

All submittals regarding color boards (Section 09915 COLOR SCHEDULE) for interior finish samples and data shall be submitted concurrently and all submittals for exterior finish samples and data shall be submitted concurrently. These color boards are in addition to the samples required under the specific technical specifications listed as "samples".

1.12.2 Variations

Variations from the solicitation (contract requirements) or the accepted 100% corrected design must be approved by the Contractor's Designer, Contractor's Quality Control Representative and Contracting Officer. For submittals which include proposed variations, the column "variation" of ENG Form 4025 shall be checked and a serial letter shall be simultaneously prepared and sent to the Area Engineer referencing this variation. The Contractor shall set forth in writing the reason for any variations and clearly annotate such variations on the submittal. The narrative shall include documentation of the nature and features of the variation and why the variation is desirable and beneficial to the Government. When submitting a variation for acceptance, the Contractor warrants that the contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of the work. The Contractor shall take actions and bear the additional costs, including review costs by the Government, necessary due to the proposed variation. In addition to the submittal review period specified above, allow ten (10) additional working days for consideration by the Government of submittals with variations. The Government reserves the right to rescind inadvertent action codes of submittals containing unnoted variations.

1.13 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

1.14 SUBMITTALS (FINAL COPY)

Upon completion of review of submittals requiring Government conformance review or approval, the submittals will be identified as having received satisfactory review by being so stamped and dated.

1.14.1 "G-AE" Submittals

The Contracting Officer has the option to review any submittal. Two (2) copies of "G-AE" submittals, for conformance review by the Government, will be returned to the Contractor, except for samples, test cylinders, and O&M manuals for which two (2) copies of the transmittal form only will be returned to the Contractor. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. All "G-AE" submittals shall be reviewed and approved by the Contractor's Designer and Contractor's Quality Control Representative prior to submittal to the Government.

1.14.2 "G-RE" Submittals

Two (2) copies of "G-RE" submittals for conformance review will be returned to the Contractor except for samples, test cylinders, and O&M manuals for which two (2) copies of the transmittal form only will be returned to the Contractor.

1.15 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

1.16 STAMPS

Stamps used by the Contractor's Designer and the Contractor's designated Quality Control person on the submittal data to certify that the submittal meets contract requirements shall be similar to the following (use two stamps for submittals reviewed by both):

CONTRACTOR	
(Firm Name)	
_____	Approved
_____ Approved with corrections as noted on submittal data and/or attached sheets(s).	
SIGNATURE:	_____
TITLE:	_____
DATE:	_____

INSTRUCTIONS
ENG FORM 4288 (RMS)

1. The Contractor shall utilize the ENG Form 4288 (RMS) generated by the Government Residential Management System (RMS) software for tracking construction submittals. The Submittal Register information, columns (c) thru (f) from the Contractor generated Submittal Register, [will be utilized by the Government] to generate the ENG Form 4288 (RMS). [The Government will furnish the Contractor a hard copy of the ENG Form 4288 (RMS) at the preconstruction conference.]. The ENG Form 4288 (RMS) includes the following items and parties responsible for completing the information required on the ENG Form 4288 (RMS):

a. Activity Number: will be provided by the Contractor from his Network Analysis, if required, and when a network analysis is accepted.

b. Transmittal Number and Item Number: will be provided by the Contractor from ENG Form 4025 for each item.

c. Specification Paragraph Number: will be provided by the Contractor from the Submittal Register from column entitled "Specification Paragraph Number".

d. Description of Submittal: will be provided by the Contractor from the Submittal Register from column entitled "Description of Item Submitted".

e. Type of Submittal: will be provided by the Contractor from the Submittal Register from column entitled "Type of Submittal" or "Description of Item Submitted".

f. Classification: will be provided by the Contractor from the Submittal Register from column entitled "Classification".

g. Reviewing Office - Reviewer: will be provided by the Contractor from the Submittal Register from column entitled "Classification" or "Reviewer".

h. Contractor Schedule Dates: the Contractor will provide schedule dates for

"Submit Needed By" (Date the Contractor expects to submit an item. It is the Contractors responsibility to calculate the lead time needed for the government approval. Note if resubmittal is required it is the Contractors responsibility to make all adjustments necessary to meet the contract completion date.)

"Approval Needed By" (date the Contractor can receive approval and still obtain the material by need date.), and

"Material Needed By" (date that the material is needed at the site. If there is a network analysis it should reflect that date on the analysis.)

i. Contractor Action: Includes the following items: "Code" and "Submit to the Corps". These items will be completed by the Contractor and/or Contractor's Designer. The action codes will be one of the following:

A - Approved as submitted.

B - Approved, except as noted.

G - Other (specify)

j. Government Action: This item includes a Government Action "Code" and "Date" and is reserved for Government use. The Government reserves the right to review any submittal for contract compliance. Receipt of an Action Code "F - Receipt Acknowledged" or failure of the Contractor to receive an Action Code by the Government, does not mean that the submittal is in compliance with the contract requirements. For this design-build solicitation, unless noted otherwise by the Contracting Officer, the Action Codes for this form, when used by the Government, will be one of the following:

- A - Reviewed for conformance. No except taken
- B - Reviewed for conformance. Exceptions as noted.
- C - Reviewed for conformance. Exceptions as noted. Refer to attached
_____ sheet resubmission required.
- D - Will be returned by separate correspondence.
- E - Reviewed. Does not comply (See Attached). Resubmission required.
- F - Receipt Acknowledged.
- Fx - Receipt acknowledged, does not comply as noted with contract requirements.
- G - Other (specify).

2. Reviewer Abbreviation code will be as follows;

G-AE - Approved by Contractor's Designer, Contractor's Quality Control Representative and Conformance Review by the Government, as applicable. Approval by the Contractor's Designer means that the submittal complies with Construction Set design submittal.

G-RE - Approved by Contractor's Quality Control Representative and Designer and conformance review by the Government.

For Information Only - All other submittals without a G-RE or G-AE abbreviation code, Approved by Contractors Quality Control Representative and/or Designer. The Government reserves the right review any submittal for conformance with the solicitation.

INSTRUCTIONS
ENG FORM 4025

1. DATE at the top of form will be the date submitted to the DOR which is to be completed by the Contractor.
2. TRANSMITTAL NO. Each new transmittal (i.e. [G-AE,] [G-ED,] G-RE or FIO) shall be numbered consecutively for each specification section in the space provided in "Transmittal No.". This number will be the identifying symbol for each submittal. Example: "15400A-001", "15895A-001" "15895A-002", "16415A-001", etc. For each new submittal or for a resubmittal, the appropriate box must be marked. Resubmittals must be designated by their original sequential number followed by an ".1", ".2", etc. for each sequential resubmittal. Example: "15895A-001.1" (previous submittal No. 15895A-001).
3. TO: Box will contain the name and address of the office which will review the submittal (as designated by the Contracting Officer).
4. FROM: Box will be the name and address of the Contractor. Contractor is to complete this box.
5. CONTRACT NO. box will contain the Contractors construction contract number (e.g., DACXXX-XX-C-XXXX).
6. CHECK ONE box will be completed by the Contractor with one box marked. If a resubmittal is provided last transmittal number will be added.
7. SPECIFICATION SECTION NO. box will be completed by the Contractor. The number will be the five digit number found in the specifications. No more than one section will be covered with each transmittal.
8. PROJECT TITLE AND LOCATION box will be completed by the Contractor.
9. Column a, will be completed by the Contractor and will contain a different number for each item submitted in that transmittal. Once a number is assigned to an item it will remain the same even if there is a resubmittal.
10. Column b, will be completed by the Contractor. The description of each item on this form will be the descriptions provided on the submittal register. The Contractor shall submit each submittal register item all at once on one transmittal if possible. If a submittal register item can not be submitted all at once Contractor should note that in the remarks box.
11. Column c, will be completed by the Contractor. The information will be the appropriate submittal description number as described this Section or shown on the submittal register (e.g. SD-XX).
12. Column d, will be completed by the Contractor. The number of copies will be determined by the Contractor after review of submittal register for the classification of the item and after review of paragraph: SUBMITTAL PROCEDURES of this Section.
13. Column e, will be completed by the Contractor. The Contractor shall state all applicable paragraph numbers.
14. Column f, will be completed by the Contractor. The Contractor shall

state all applicable drawing sheet numbers.

15. Column g, will be completed by the Contractor and/or Contractor's Designer. The action codes will be one of the following:

- A - Approved as submitted.
- B - Approved, except as noted.
- G - Other (specify)

16. Column h, will be completely by the Contractor. A check shall be placed in this column when a submittal is not in accordance with the plans and specifications also, a written statement to that effect shall be included in the space provided for "Remarks".

17. Column i, is reserved for Government use and may or may not be provided. For this design-build solicitation, unless noted otherwise by the Contracting Officer, the Action Codes for this form, when used by the Government, will be one of the following:

- A - Reviewed for conformance. No except taken.
- B - Reviewed for conformance. Exceptions as noted.
- C - Reviewed for conformance. Exceptions as noted. Refer to attached
_____ sheet resubmission required.
- D - Will be returned by separate correspondence.
- E - Reviewed. Does not comply (See Attached). Resubmission required.
- F - Receipt Acknowledged.
- Fx - Receipt acknowledged, does not comply as noted with contract requirements.
- G - Other (specify).

18. REMARKS box self explained.

19. Contractor Quality Control Manager must provide name and sign all Eng Form 4025 certifying conformance. In the space for the name and signature, also include a phone number where the CQC Manager may be reached.

20. Section II will be completed by the Contractor, unless approval is required by the Government.

See reverse side of ENG Form 4025 for additional instructions.

-- End of Section --

[illegible]

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TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES OR MANUFACTURE'S CERTIFICATES OF COMPLIANCE	DATE	TRANSMITTAL NO.

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (This section to be initiated by the Contractor)

TO:	FROM:	CONTRACT NO.	CHECK ONE: <input type="checkbox"/> THIS IS A NEW TRANSMITTAL <input type="checkbox"/> THIS IS A RE-SUBMITTAL OF TRANSMITTAL NO. _____
SPECIFICATION SECTION NO.	PROJECT TITLE AND LOCATION		CHECK ONE: <input type="checkbox"/> FIO <input type="checkbox"/> G-RE <input type="checkbox"/> G-AE

ITEM NO.	DESCRIPTION OF ITEM SUBMITTED (Type, size, model, etc.)	MFG. OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO.	NO of COPIES	CONTRACT REFERENCE DOCUMENT		FOR CONTRACTOR USE CODE	VARIATION (SEE #6)	FOR CE USE CODE
				SPEC. PARA.	DWG. SHEET			
a.	b.	c.	d.	e.	f.	g.	h.	i.

REMARKS:	I certify that the above submittal items have been reviewed in detail and are correct and in strict compliance with the contract drawings and specifications except as otherwise stated.
	NAME, PHONE NUMBER, AND SIGNATURE OF CONTRACTOR QC

SECTION II - REVIEW / APPROVAL (For Variation Only) ACTION

ENCLOSURES RETURNED (List by Item No.)	NAME, TITLE, AND SIGNATURE OF REVIEWING AUTHORITY	DATE

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.
2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.
3. The "Item No." will be the same "Item No." as indicated on ENG FORM 4288-R for each entry on this form.
4. Submittals requiring expeditious handling will be submitted on a separate form.
5. Separate transmittal form will be used for submittals under separate sections of the specifications.
6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications--also, a written statement to that effect shall be included in the space provided for "Remarks".
7. Form is self-transmittal, letter of transmittal is not required.
8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in column c, Section I.
9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column i to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

- | | |
|--|--|
| A - Reviewed for compliance. No exceptions taken. | E - Reviewed. Does not comply (see attached).
Resubmission required. |
| B - Reviewed for compliance. Exceptions as noted. | F - Receipt acknowledged. |
| C - Reviewed for compliance. Exceptions as noted.
Refer to attached sheet; resubmission required. | FX - Receipt acknowledged. Does not comply
as noted with contract requirements. |
| D - Will be returned by separate correspondence. | G - Other (Specify) |

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

(Reverse of CENWO-CD-Q SUBMITTAL FORM, D/B-1 (Omaha Version of ENG Form 4025-R))

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9/01; Rev 2/02

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 - 3.7.5 100% Corrected Design Reproduction Set (For Construction Use)
 - 3.7.6 Government Design Review and Acceptance
 - 3.7.6.1 Design Review Conference and Post-Design Review Conference Action:
 - 3.7.6.2 Complete Design Documents
 - 3.7.6.3 Accuracy and Completeness of Design
 - 3.7.7 DD Form 1354, Transfer and Acceptance of Military Real Property
- 3.8 REVISIONS TO THE ACCEPTED DESIGN

-- End of Section Table of Contents --

SECTION 01332

SUBMITTALS DURING DESIGN

9/01; Rev 2/02

PART 1 GENERAL

Attachments: Attachment A, Design Certification and Transmittal Letter
DD Form 1354 - Transfer and Acceptance of Military Real
Property
Draft Army Pamphlet 405-45, Real Property Inventory
Management, Table B-16 "Preparation of DD Form 1354"

1.1 SUMMARY

1.1.1 Section Includes

This section includes general requirements for developing and submitting a design including preparation of drawings, specifications and design analyses conforming to the requirements contained in this section. See Section 01336 60 PERCENT DESIGN REQUIREMENTS and Section 01338 100 PERCENT DESIGN REQUIREMENTS for specific requirements.

1.1.2 Section Excludes

This section does not include requirements for construction submittals which are specified in Section 01330, "Submittal Procedures."

1.2 REFERENCES

The references listed below form a part of this specification to the extent referenced.

1.2.1 THE CONSTRUCTION SPECIFICATIONS INSTITUTE (CSI)

CSI Masterformat

Master List of Section Titles and Numbers

1.2.2 OMAHA DISTRICT CADD STANDARDS MANUAL

(a) Omaha District CADD Standards are available at the following internet address:

ftp://ftp.nwo.usace.army.mil/pub/ED/CADD/ae/standards/

file: ACADstd.pdf for AutoCAD.

(b) Corps of Engineers Civil Standards.

ftp://ftp.nwo.usace.army.mil/pub/ED/CADD/ae/DesBld/

file: civilstd.pdf

1.2.3 WEB SITES

In addition to the web sites listed in this section, Sections 01001 SUMMARY OF WORK thru 01008 FIRE PROTECTION list web sites where design criteria

references used in this solicitation package may be found.

NOTE: FOR ITEMS (a), (b), AND (c) BELOW, REFERENCES TO RECEIVING APPROVAL FROM OTHER GOVERNMENT AGENCIES FOR ALTERNATIVE DESIGNS ARE NOT APPLICABLE TO THIS PROJECT. THE CONTRACTOR IS THE DESIGNER WHEN READING THESE DOCUMENTS.

ALL ITEMS LISTED BELOW ARE CONSIDERED TO BE A PART OF THE RFP SOLICITATION DOCUMENT (AS APPLICABLE) AND THE RESULTANT CONTRACT.

(a) TECHNICAL MANUALS (TM), TECHNICAL INSTRUCTIONS (TI), AIR FORCE MANUALS (AFM), ENGINEERING TECHNICAL LETTERS (ETL), ARMY ARCHITECTURAL AND ENGINEERING DESIGN CRITERIA (AEI), SUSTAINABLE DESIGN DOCUMENTS, AND MILITARY HANDBOOKS (MIL HANDBK) can be obtained from the National Institute of Building Sciences Construction Criteria Base (CCB) on CD-ROM. Contact the CCB directly at (202) 289-7800 for an order form or obtain an order form at the following internet address:

<http://www.ccb.org/ccbsubscribe/Subsmain.asp>. There is a regular annual subscription fee to the CCB (Price is noted on internet address, currently \$700 per year). The CCB is available on CD-ROM or DVD. Selected references are also available for downloading in Acrobat .pdf file format at the following internet address:

<http://www.hnd.usace.army.mil/techinfo>.

Additional web sites are as follows:

(1) TECHNICAL MANUALS, ETL's, ETC.:

www.usace.army.mil/inet/usace-docs

Click on "Information", then the desired publication.

(2) AIR FORCE DESIGN CRITERIA:

<http://afpubs.hq.af.mil>

(3) UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

This includes UFGS sections referenced, but not provided in the solicitation and other UFGS sections required in developing the project specifications. Unless noted otherwise these Guide sections are located on the CD-ROM issued with solicitation (Specsintact files under a directory labeled "Guides" An Index of available UFGS sections is included in Attachment No. 3 of this RFP.

Specsintact software is available on the CCB referred to paragraph (a) above or may be downloaded at the following internet address:

<http://si.ksc.nasa.gov/specsintact/software/software.htm>

SI Version 3.0 (Version SI3.2.388) or later shall be used. The new unified submittal format shall be selected for file format. A copy of the software (SI Version 3.0) has been included on the CD-ROM issued with this solicitation. See folder: "Software", file "si3.exe".

1.3 METRIC REQUIREMENTS

(a) Wherever possible, this project shall be accomplished using "hard" metric measurements; drawings, narratives, calculations, dimensions, capacities, and similar expressions of measurement shall be expressed in "hard" metric units.

(b) Products and building components furnished in "hard" metric units are manufactured using SI units of measure.

(c) Soft metric conversions from their English units are permitted for modular construction products, unless the application of the product requires it to dimensionally coordinate into the 100 millimeter building module. Modular construction products are brick, concrete block, wallboard, plywood, suspended ceiling systems, recessed lighting, raised access flooring and other manufactured components with dimensions based upon a four (4) inch building module. Coordinate finishes available in metric with those available in non-metric. BUILDING SHALL BE CONSTRUCTED TO THE 100 MM BUILDING MODULE.

(d) Drawings shall be stated in SI units of measure (metric). Where permitted by technical or submittal requirements of this solicitation, the Contractor may provide a table of metric and english unit equivalencies. Specifications shall be stated in SI units of measure (metric) only, unless the UFGS or designated CEGS guide specifications provide only a metric unit followed by the English equivalency in parantheses or where requirements for equipment are only available in English units. See Section 01415 METRIC MEASUREMENTS for additional information.

(e) The designer shall obtain a copy of and follow the requirements in the "Metric Design Guide (PBS-PQ260), September 1995, U.S. General Services Administration Public Buildings Service. A copy is provided in Attachment No. 3 of this RFP.

1.4 DEFINITIONS

1.4.1 Contractor

Firm or company to whom award was made to design and construct the Medical/Dental Clinic, located at Schriever AFB, Colorado .

1.4.2 Design

Documents or deliverables, as defined in this section, prepared by or under the direct supervision of registered professional architects and engineers and proposed by the Contractor to meet the requirements of this solicitation.

1.4.3 Design Drawings

Documentation showing in graphic and quantitative form the extent, design, location, relationships, and dimensions of the construction to be provided by the Contractor. (Note: Shop Drawings, as defined in Section 01330, "Submittals Procedures" are not to be provided until after design drawings are determined satisfactory for construction.)

1.4.4 Designer

Architects and Engineers (A-E) associated with the Contractor who are

responsible for (1) preparing the design documents, (2) checking construction submittals, considered extensions of design (A-E), for compliance with the prepared Construction set design documents and (3) have the qualifications and experience specified herein.

1.4.5 Request for Proposal (RFP)

Documents furnished to prospective offerors containing proposal information and specifying criteria and project requirements for design and construction of a Medical /Dental Clinic located at Schriever AFB, Colorado . The documents include this specification, attachments, and the RFP drawings.

1.5 QUALITY ASSURANCE

1.5.1 Construction Personnel Experience

The Construction Personnel experience shall be as submitted per the requirements of Section 00110: PROPOSAL INSTRUCTIONS, SUBMISSION REQUIREMENTS AND EVALUATIONS. If, because of reasons beyond the control of the construction firm, the named individuals are not able to fulfill this obligation, replacement personnel with similar skills and experience shall be presented for acceptance by the Contracting Officer. The Contractor shall obtain the Contracting Officer's written consent before making any substitution for these designated personnel.

1.5.2 Designer Qualifications and Experience

The designer qualifications and experience shall be as submitted per the requirements of Section 00110: PROPOSAL INSTRUCTIONS, SUBMISSION REQUIREMENTS AND EVALUATION. If, because of reasons beyond the control of the design team, the named individuals are not able to fulfill this obligation, replacement personnel with similar education and experience shall be presented for acceptance by the Contracting Officer. The Contractor shall obtain the Contracting Officer's written consent before making any substitution for these designated personnel.

1.6 SUBMISSION OF DESIGN DRAWINGS, SPECIFICATIONS AND DESIGN ANALYSES

1.6.1 Design Certification

Within each design submittal, the Contractor shall certify that all items submitted in the design documents (after construction award) comply with Division 1 specifications and mandatory requirements of the UFGS and designated CEGS. The criteria specified in this RFP are binding contract criteria and in case of any conflict, after award, between the RFP criteria and Contractor's submittals, the RFP criteria will govern unless there is a written and signed agreement between the Contracting Officer and the Contractor waiving a specific requirement. The Contractor shall present with the letter of transmittal for each design submittal (including the 100% corrected design (backcheck) submittal) a certification that the submittal (plans, specifications, design analysis, etc.) complies with the requirements stated above, similar to that shown at Attachment A of this section.

1.6.2 Deviations

Deviations from the RFP technical requirements shall be identified in the

letter of transmittal. Deviations from the RFP technical requirements will be considered and accepted by the Contracting Officer, if the changes results in a significant improvement to the project or it exceeds the minimum RFP technical requirements.

1.6.3 Field Inspection

The Contractor shall verify field conditions which are significant to design, by field inspection, researching and obtaining all necessary existing facility as-built drawings and reproducing them for his own use as necessary, and discussing status with knowledgeable personnel. The information shall be reflected in the design documents.

1.6.4 Drawings

1.6.4.1 Software Requirements

All design drawings shall be done by the Contractor using AutoCAD 2002 file format. Format shall conform to the Omaha District CADD Standards and the Omaha District CADD Design File and Sheet Naming Conventions. See Omaha District CADD Standards website listed above.

1.6.4.2 RFP Drawings

The drawings furnished with this solicitation will be furnished to the Contractor in AutoCAD 2002.dwg file format within 30 calendar days of contract award.

1.6.5 Design Documents

Design documents, as required by the 60 percent and 100 percent design submittals stated hereafter, shall include construction drawings, specifications and design analysis for categories such as, but not limited to, architectural, interior design, structural, mechanical, electrical, grading, drainage, paving, and outside utility services. Specifications shall be in sufficient detail to fully describe and demonstrate the quality of materials, the installation and performance of equipment, and the quality of workmanship. Detailing and installation of all equipment and materials shall comply with the manufacturer's recommendations. The design analysis shall be for each discipline of work and shall include all features with the necessary calculations, tables, methods and sources used in determining equipment and material sizes and capacities, and shall provide sufficient information to support the design.

1.6.6 Design Reviews

A minimum of two design reviews during design will be held at Schriever AFB at the 60 percent and the 100 percent completion stages of the final design. A backcheck review will be made on the Corrected 100 percent design. Once that the Corrected 100 percent design is reviewed and determined to be satisfactory for the purpose of beginning construction, the Contractor shall prepare and distribute sets of documents for construction. The Contractor shall attend the design reviews, visit the site and make other trips as necessary during the design to accomplish the

work.

1.6.7 Document Packaging

The 60 percent design submittal includes the 60 percent complete site and utility design and building design. These documents shall be packaged and stamped "For Review Only - 60% Design"; and each sheet of the drawings shall also be stamped. The 100 percent design submittal includes 100 percent complete site and utility design and building design and shall be stamped "For Review Only -100% Design", and each sheet of the drawings shall also be stamped. The backcheck design submittal(s) after the Government review of the 100 percent complete site and utility design and building design shall be stamped "100% Corrected Design"; and each sheet of the drawings shall also be stamped. The 100% Corrected Design submittal is for making corrections resulting from review comments and for preparing the final project documents. No additional time for completion of the contract will be granted to the Contractor due to insufficient design submittals. See paragraph 3.7.6 "Government Design Review and Acceptance" for additional requirements.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 DRAWINGS

Prepare, organize, and present drawings in the format specified herein. Provide drawings complete, accurate and explicit enough to show compliance with the RFP requirements and to permit construction. Drawings illustrating systems proposed to meet the requirements of the RFP performance specifications shall reflect proper detailing for each such system to assure appropriate use, proper fit, compatibility of components and coordination with the design analysis and specifications required by this section. Coordinate drawings to ensure there are no conflicts between design disciplines and between drawings and specifications. For specific drawing requirements, see Sections 01336 60 PERCENT DESIGN REQUIREMENTS and 01338 100 PERCENT DESIGN REQUIREMENTS. The following subparagraphs cover general drawing requirements.

3.1.1 Drawings Format

Full size drawings are considered 594 mm x 841 mm. Half-size drawings are considered 420 mm x 297 mm. Title block shall be as indicated in the Omaha District CADD Standards Manual. Recommended drawing scales are specified in Sections 01336 60 PERCENT DESIGN REQUIREMENTS and 01338 100 PERCENT DESIGN REQUIREMENTS. The Cover Sheet of the Contractor prepared drawings shall bear the stamp or seal and signature of the registered architect or appropriate engineer responsible for the work and proposed to meet the RFP requirements. Drawing code numbers for the design and construction drawings shall be as follows:

AF 550-30-01

3.1.2 Drawings Sequence

Arrange drawings by design discipline in accordance with Omaha District CADD Standards Manual.

3.1.3 Drawings Required

As a minimum, the Contractor shall prepare and submit the following design drawings:

- a. Title Sheet, Index of Drawings, Legend and Abbreviations and Soil Borings.
- b. Civil Drawings
- c. Utility Drawings (Water Supply, Wastewater, Gas, and Electrical)
- d. Architectural Drawings
- e. Interior Design Drawings
- f. Structural Drawings
- g. Mechanical Drawings
- h. Plumbing drawings
- i. Electrical Drawings
- j. Fire Protection Drawings

3.2 SPECIFICATIONS

The Contractor shall develop project specifications utilizing the Division 1 Specifications furnished with this RFP; unedited Unified Facilities Guide Specifications (UFGS); designated specification sections furnished with this RFP; and the development of additional project specifications not covered by UFGS. Guide specifications are located on the CD-ROM issued with this solicitation.

The Contractor shall utilize Specsintact software.

Minimum and recommended hardware requirements are as follows:

MINIMUM REQUIREMENTS	RECOMMENDED REQUIREMENTS
486 (Windows 95/98/MENT/2000) Pentium NT/2000	Pentium 133 - Windows 95/98/ME Pentium 266 NT/2000
16MB RAM (Windows 95/98) 32MB RAM (Windows NT/ME) 64MB RAM (Windows 2000)	32MB RAM (Windows 95/98) 64MB RAM (Windows NT/ME) 128MB RAM (Windows 2000)
24MB (local) 56MB (Network) Free Hard Drive Space	50 MB (local) 75 MB (Network) Free Hard Drive Space
SVGA Monitor	SVGA Monitor with 800 x 600 resolution
3 1/2 inch 1.44 MB floppy drive	3 1/2 inch 1.44 MB floppy drive
CD ROM Drive	CD ROM Drive
Laser Printer	Laser Printer

Note: Additional Hard Drive space is required for storing project specifications and masters.

a. Technical Specifications

The Contractor shall be required to use unedited UFGS and designated unedited CEGS sections for developing project specifications. Specification paragraphs and subparagraphs shall not be rewritten to lessen the quality of the original technical specification sections. The technical guide specifications describe the type and quality of material and installation normally acceptable for Corps of Engineers Construction, and often represent specific agreement between the Corps and the applicable industry. The provision of the technical guide specification should not be changed without justification. Justifications and identification for additional materials shall be identified in the design analysis under the appropriate design discipline. Designer notes shall not appear in any design submittals. Only bracketed choices and inapplicable items shall be marked for deletion. These items shall be removed in corrected 100 percent specifications submittal. The Contractor shall complete the editing of all options in these specifications. Where designer notes are provided, the Contractor shall edit the choice in accordance with the recommendations and guidance of the Notes, except where specific guidance has been provided with this RFP (i.e. submittal paragraph). See additional requirements in Sections 01336 60 PERCENT DESIGN REQUIREMENTS and 01338 100 PERCENT DESIGN REQUIREMENTS.

b. Editing Technical Specifications (Designated CEGS or UFGS)

(1) ADDITIONS: If the specifications of the UFGS does not cover a feature that is in the project, new sentences and/or paragraphs shall be inserted in the proper locations to adequately cover the feature of work. Additions shall not lesson the quality of materials indicated by the specifications. If a new material is added, it shall be properly referenced in "Applicable Publications," "MATERIALS," "SUBMITTAL," "TESTS," and "INSTALLATION" paragraphs, as applicable.

(2) DELETION OF INAPPLICABLE TEXT MATERIAL, AS NECESSARY, TO TAILOR THE SPECIFICATIONS TO FIT THE PROJECT: After deletion has been made to all inapplicable paragraphs, subparagraphs, choices, and schedules from the body of the specifications (including but not limited to the correction of lists in "Submittals," "Tests," and "Installation" paragraphs), delete all nonapplicable references listed in the preceding "APPLICABLE PUBLICATIONS" and "MATERIALS" paragraphs. Deletions shall not lesson the quality of materials indicated by the specifications.

(3) Do not remove any special code markings for submittals, references, tests or section references, unless the text is not required.

(4) REFERENCES TO SPECIFICATION SECTIONS. The Contractor shall be responsible for coordinating references, along with the technical requirements, to specific specification sections (number and title) within the project specifications. Section references (title and number) shall be revised to reflect the titles and numbers of specification sections used.

(5) SUBMITTALS. Each section of the specifications includes a

submittal paragraph which lists all applicable Contractor submittals: (a) for review and approval by the Contractor's designer and, (b) for "For Approval" or "For Information Only" by Construction field offices. Submittals shall be properly marked as outlined in the Specsintact documentation and in this section. These codings are used for automatic generation of the Submittal Register in the Specsintact Software. These codings must NOT be deleted from the text, unless the submittal is not required. The Submittal Item text between the coding shall be identical (word for word, including punctuation and spacing) to the paragraph text in the reference paragraph(s). Text may be either upper or lower case letters. An example of an submittal paragraph is listed below with text telling what each item stands for directly below each listing.

"1._ SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fire Sprinkler Design Drawings; G-AE

SD-03 Product Data

Meters; G-RE

Regulators

SD-08 Manufacturer's Instructions

Dielectric Unions

Pressure Reducing Valves

See Section 01330: SUBMITTAL PROCEDURES for the list of Submittal Descriptions and Numbers and for submittal classification and further explanation of the submittal process.

Submittal Classifications (G-AE, G-RE, and FIO) are as follows:

G-AE - G-AE submittals are limited to those that address design work to be performed by the Construction Contractor, items that are considered extremely critical to the designer, or items that involve life safety issues. These submittals are considered to be an extension of design and must be approved by the Contractor's designer of the responsible design organization. Some examples of G-AE submittal extensions of design would include contract documents which do not show complete details of design, contract documents with performance type requirements, critical materials that would be difficult to access for corrections or when the Contractor intends to deviate or vary from the design. The Government will review all G-AE approved submittals for conformance to the Solicitation. The Government will review all submittals designated as deviating from the Solicitation or completed design.

G-RE - G-RE submittals are those that need to be reviewed for conformance to the contract by either the Area or Resident Office (as directed). Some examples of G-RE submittals would include variations from the Solicitation package or 100% Corrected Design and other items as designated by the Contracting Officer's Representative. Submittals shall be reviewed and approved by the Contractor's Quality Control Representative and Designer (if applicable), prior to submittal to the Government.

FIO - For Information Only. FIO submittals are those submittals that demonstrate to the Contractor that subcontractors and suppliers are providing materials, equipment, and installation conforms to the contract requirements. FIO submittals also provide information that the Contractor's Quality Control representative needs to verify that the quality specified in the contract is being incorporated into construction of the project. These submittals shall be approved by the Contractor's Quality Control Representative and/or Designer, prior to submittal to the Contracting Officer's Representative. Some examples of FIO submittals would include reports, records, data, instructions and catalog cuts. NOTE: "FIO" IS ANY SUBMITTAL ITEM THAT DOES NOT HAVE A "G-AE" OR "G-RE" CLASSIFICATION. SEE PARAGRAPH BELOW ON HOW TO CORRECTLY IDENTIFY A FIO SUBMITTAL.

For each submittal requirement in the Guide specification, designers shall indicate a submittal type (G-AE, G-RE, or FIO) or shall delete the requirement for the submittal. For submittals that are preselected in the Guide Specification as G or GA, the designer must evaluate the submittal to determine if it is an extension of design. If so, the designer shall change the G or GA to G-D1. Designers shall delete all Certificates (Submittal Designation (SD-07)) except those preselected in the Guide Specifications or required by regulation, code, or law. The designer shall designate these as FIO. To designate a submittal item as FIO, mark the semi-colon following the submittal item and also the submittal tags up to the Item tag for deletion (i.e. "; [], []") Designers shall designate all Instructions (SD-08), Test Reports (SD-09 or SD-06), and Closeout Submittals (SD-11) as FIO. Designers shall identify submittal classifications for all required submittals.

(6) USE OF UFGS SECTIONS

UFGS sections are joint effort of the U.S. Army Corps of Engineers (USACE), the Naval Facilities Engineering Command (NAVFAC) and the Airforce Civil Engineer Support Agency (AFCEA). Unless directed to otherwise, use UFGS sections. Available UFGS sections include sections that have a 5 digit section number with either the letters "A" or "N" following the section number or no letter following the section number.

The letters designate the specification proponent ("A" is for USACE and "N" is for NAVFAC). The Contractor shall use sections with the letter "A" following the section number or sections with no letter following the section number. Sections with the letter "N" following the section number shall not be used unless there is no other available section, the solicitation directs the use of these sections or the available sections do not meet the solicitation requirements. Do not use Division 1 Sections that have the letter "N" following the section number. Where UFGS sections include tailoring options for both Army and Navy, use the Army tailoring option. Where conflicts exist that cannot be resolved, the Contracting Officer shall be contacted to resolve the issue.

c. Developing Additional Project Specifications.

If the need should arise for developing project specifications on materials/items not covered in by the UFGS or designated CEGS, the Contractor shall develop specifications utilizing commercial Construction Specifications Institute (CSI), 16 Division, 3 Part Section Format. These specifications shall conform to the applicable criteria requirements indicated in the solicitation (Sections 01001 thru 01008). For these specification sections, write at the Mediumscope level of detail as described in CSI Masterformat. Use Mediumscope level section numbers and titles as identified in CSI Masterformat. Adjust section numbers which conflict with the specifications used in the Project Specifications. Each of these developed specification sections shall be in the same format as the CSI format specifications included in the UFGS (including the submittal paragraph). Commercially available guide specifications such as "SpecText" published by The Construction Specifications Institute and "MasterSpec" published by The American Institute of Architects or Unified Facilities Guide Specifications (UFGS) may be used, subject to the format, coding and submittal paragraph requirements. References to the "Architect/Engineer" and the "Owner" shall be changed to refer to the "Government" or "Contracting Officer," as appropriate. The specifications shall clearly identify, where appropriate, the specific products chosen to meet the requirements of the specifications (manufacturers' brand names and model numbers or similar product information). The Contractor shall be responsible for coordinating references, along with the technical requirements, to specific specification sections (number and title) within the project specifications. Section references (title and number) shall be revised to reflect the titles and numbers of specification sections used.

d. Division 1 Sections

Include Division 1 specifications sections (01040 AS-BUILT DRAWINGS, 01200 WARRANTY OF CONSTRUCTION, 01320A PROJECT SCHEDULE, 01330 SUBMITTAL PROCEDURES, 01355 ENVIRONMENT PROTECTION, 01415 METRIC MEASUREMENTS, 01451A CONTRACTOR QUALITY CONTROL, 01565 (FEDERAL FACILITIES COLORADO) NPDES PERMIT REQUIREMENTS FOR STORM WATER DISCHARGES), and Government edited sections listed in Attachment 3C contained in the RFP as part of the project specifications without change. Copies of these sections and other Division 1 specifications included with the RFP will be furnished (upon request) to the successful offeror in Specsintact (Division 1 specs) and WORD 97 (Attachment No 3C, Technical Specs, except 15951, which is in Specintact). Any other Division 1 Specifications required by the Contract shall be the responsibility of the Contractor. No other Division 1 Specifications will be required, unless specified otherwise in this solicitation or required by the Contractor.

3.2.1 Format for Project Specifications

Submit the project specification, including a Cover page and Table of Contents, printed with a word processor (Using Specintact software) using good quality white paper. For the 60 percent and 100 percent design submittals, editing of the UFGS shall be shown as indicated in the Specsintact documentation for text deletions and for text insertions. The corrected 100 percent specifications with review comments incorporated shall be cleaned up (markings for insertion and deletion removed) and submitted in both hard copy and on magnetic media (A Microsoft Windows compatible CD-ROM and compatible with the "Specsintact" micro computer software package.). The Cover page and attachments to specification sections shall be prepared in a Microsoft Word (compatible with Microsoft

Word 97) format. Carbon copies are not acceptable.

Format shall be as outlined in the Specsintact documentation.

Each specification section shall include a Section Table of Contents which is combined with the page numbering of the specification section.

The Cover page shall be similar to the RFP Cover page and shall include:

- a. Project title, Project Number, activity and location
- b. Construction contract number
- c. Construction Contractor's name and address
- d. Design firm's name and address
- e. Names of design team members (Designers of record) responsible for each Contractor prepared technical discipline of the project specification
- f. Name and signature of a Principal of the design firm

The Table of Contents shall list the 16 Divisions contained in CSI format and the specification section numbers and titles contained in the project specification.

3.2.2 Reports

The Contractor shall submit the following Specsintact reports with the 100 percent and Corrected 100 percent design submittals: Address Verification, Reference Verification, Section Verification, Bracket Verification, Submittal Verification, Submittal Register and any other reports requested by the Contracting Officer. References shall be reconciled when printing reports. The reports to be submitted for review shall be after the Contractor has corrected the errors generated by these reports. From the errors generated by the reference verification reports, fix only those errors where there is a discrepancy with the issue date of a publication (i.e., NFPA 70, revise to the latest code requirement). Address, Reference and Submittal Reconciliation shall be completed prior to submittal of the 100 percent design.

3.2.2 Construction Submittals

All construction submittals shall be in accordance with Section 01330, "SUBMITTAL PROCEDURES".

Construction submittal types and products, including the submittal description numbers and data package numbers, shall be included in the specification sections, where required. When appropriate, use specific product terms instead of the generic product terms contained in the specifications sections (e.g., asphalt shingles, built-up roofing, EPDM single ply, etc. vs roof covering; concrete masonry units, brick, metal siding, etc. vs exterior skin; mineral fiber board, block, batt or blanket, polystyrene, polyurethane, polyisocyanurate board vs insulation).

3.2.2.1 Submittals Register (Form)

Prepare and maintain a Submittals Register. The Submittal Register (ENG

Form 4288 "Submittal Register" shall be prepared using Specsintact Software. Additional instructions for completing the form are contained in Section 01330, "Submittal Procedures."

Fill in columns "c" through "f" and submit with the 100 percent design submittal. The Submittal Register will be returned to the Contractor along with the reviewed and accepted design.

Resubmit the Submittal Register as a construction submittal as required in Section 01330, "SUBMITTAL PROCEDURES." The Contractor shall provide an electronic copy of the accepted submittal register, generated by the Specsintact software, three (3) working days prior to the pre-construction conference. Remaining columns will be filled in at the appropriate time and by the appropriate authorities during construction.

3.3 DESIGN ANALYSES

Prepare design analyses (basis of design and calculations) for each design discipline. Specific requirements relative to the technical content to be provided are specified herein and in Section 01336 60 PERCENT DESIGN SUBMITTALS and Section 01338 100 PERCENT DESIGN SUBMITTALS. The design analyses shall include a basis of design and calculations for each discipline. The design analyses shall be a presentation of facts to demonstrate that the concept of the project is fully understood and that the design is based on sound engineering. The design analysis for each discipline shall include:

a. A basis of design consisting of:

(1) An introductory description of the project concept which addresses the salient points of the design;

(2) An orderly and comprehensive documentation of criteria, rationale, assumptions and reasoning for system selection.

b. Calculations required to support the design.

c. Project Engineering Considerations and Instructions (ECI) for Final Design Analysis.

The Contractor shall not make reference to the RFP task order to avoid stating the requirements for the basis for design.

3.3.1 Format

The design analysis shall include: a cover page indicating the stage of design "PRELIMINARY DESIGN ANALYSIS": for 60 percent design submittal and "FINAL DESIGN ANALYSIS" for 100 percent design submittal, the project title "MEDICAL/DENTAL CLINIC, GLEN 023001", fiscal year and program funding "FY 2002 MCP", location "SCHRIEVER AFB, COLORADO", who prepared the design analysis "Prepared By:" followed by Name of AE and Construction Contractor, location of AE and Construction Contractor Office involved with the design, and construction contract number; table of contents; and tabbed separations for each part of design analysis for quick reference. The cover sheet shall indicate the volume number and total number of volumes for the project. Provide a cover sheet for each volume. Submit design analyses prepared on 8 1/2 by 11 inch white paper. The design analysis for all disciplines shall be bound in one volume, excluding calculations. Multiple

volumes for individual disciplines, appropriately numbered, may be provided, when required. For Electronic media requirements, see the NOTES for the 100 Percent Corrected Design Set (For Construction)(see paragraph 3.7.1.5). Narratives shall be provided in decimal paragraph numbering system (i.e. 1, 1.1, 1.1.1, 1.1.1.1 etc.). Narratives shall be an original document that does not copy the text from the RFP document sections, unless directed otherwise and shall be written in the same tense (Past or Present) for the entire design analysis. Organize design analysis narrative into the following parts, as follows:

3.3.1.1 Part 1 - General Description.

This part will provide statements of purpose, authority and applicable criteria. A description of the project and a summary of the economic factors influencing the choice of the civil, architectural, structural, mechanical, electrical, fire safety, water supply and wastewater disposal systems used in the project shall be provided along with an indication of how initial and life costs were considered.

a. Purpose. Include the following statement under the heading of "PURPOSE": Contact Michael Armstrong (402) 221-3981 for Design Analysis Information needed here.

b. Authority. Provide the following authorization statement under the heading "AUTHORITY" for the project: Contact Michael Armstrong (402) 221-3981 for Design Analysis Information needed here.

"The preparation of design documents was authorized by Design Directive # [___] dated [___]." Contact Michael Armstrong (402) 221-3981 for Design Analysis Information needed here.

c. Applicable Criteria. Provide a list of the general criteria that pertains to all disciplines used in the design. Specific criteria used in a particular engineering/architectural discipline shall be listed in the text of the appropriate discipline in Part 2 of the design analysis. Such criteria shall be referenced accordingly.

d. Project Description. Provide a description of the project and summary of economic factors influencing the choice of materials and systems used in the project.

3.3.1.2 Part 2 - Design Requirements and Provisions.

This part of the design analysis shall provide statements of factors considered and provided in the design along with supporting justification of design decisions and design calculations. Include narratives for each of the following areas or disciplines. See Sections 01336 60 PERCENT DESIGN REQUIREMENTS and 01338 100 PERCENT DESIGN REQUIREMENTS for specific requirements.

- a. Civil
- b. Water Supply and Wastewater
- c. Architectural
- d. Interior Design
- e. Structural

- f. Mechanical
- g. Electrical
- h. Fire Protection
- i. Environmental Protection, Compliance and Permits
- j. Health and Safety
- k. Sustainable Design

3.3.2 Calculations

All calculations shall be placed in separate appendix volume(s). Calculations shall include a cover page similar to the design analysis narrative cover page, a table of contents, index page and a summary of criteria for each appendix on the first pages and the project title, and location identified on every page of the calculations. All calculation pages shall be clearly legible and photo-ready. Each discipline which requires calculations shall be consecutively numbered (Example: A-1, A-2, A-3 etc. for Water Supply and Wastewater Calculations and B-1, B-2, B-3, etc. for Structural Calculations) and the date. Cite criteria from which the calculations, rationale, and formulae are extracted by publication number, title, edition and page number. The cover page and each page of calculations shall also include the names of the persons originating and checking the calculations. The person checking the calculations shall be a registered professional engineer other than the originator. In addition, the signature and seal of the appropriate registered professional engineer responsible for the work shall appear on the cover page of the calculations for each discipline. Each appendix index page shall list subtopics (e.g. for Structural - Loads, Materials, References, Wind Analysis, Footing Design, Wall Design, Column Design, etc.) with pages numbers where each of these subtopics can be found in the calculations.

Computer printouts shall be consecutively page numbered and identified similar to the calculations. Identify the computer program name, source, and version. All schematic models used for computer input shall be provided.

3.3.3 Engineering Considerations and Instructions (ECI) for Field Personnel

3.3.3.1 Separate Appendix

Under a separate appendix in the Final Design Analysis, the Design-Build Contractor shall include the following items:

- a. Features critical to the quality of the final construction product requiring special attention.
- b. Submittals requiring special attention during construction.
- c. Special user requirements or instructions.
- d. Assumed field conditions, pertinent significant aspects, or critical phases of the project used as a basis of project design.

3.3.3.2 Format

Format for ECI's shall include the following information:

"ENGINEERING CONSIDERATIONS AND INSTRUCTIONS

Project Name: _____

Location: _____

Designer Name: _____ Phone: _____

Discipline: _____

Design-Build designers have prepared the following engineering considerations and instructions (ECI). These ECI's should be followed during the construction of the above project. If you have any questions, contact the appropriate Design-Build designer."

3.3.3.3 Distribution of ECI's

In addition to including ECI's in a separate appendix of the final design analysis and after acceptance of the 100 percent corrected design and prior to the start of construction, the design-build Contractor shall e-mail a copy of the ECI's to the appropriate U.S. Army Corps of Engineer's Field representative for his consideration with a copy also sent to the appropriate individual in following office(s): CENWO-CD-QR and CENWO-PM-M.

The Government will provide the names and e-mail addresses to the design-build Contractor at either the pre-design or pre-construction conference.

3.3.4 Requests for Information, Meeting Minutes and Comments

Copies of Requests for Information (RFI) made by the Contractor to the Government shall be included as an appendix to the design analysis. An index of each RFI, which documents the RFI number, the date RFI given to Government, the date the RFI is answered and the Action Response provided by the Government.

A copy of all meeting minutes and design review comments (if any) with action responses shall be included as an appendix to the design analysis.

Appendices for RFI's and Meeting Minutes and design review comments shall have page numbering that follows the same format as for Calculations listed above.

3.4 DESIGN CERTIFICATION

The Contractor shall provide certification signed by an officer of the Contractor's company attesting that the drawings, specifications and design analyses prepared for the construction of the facility meet the requirements of the RFP. The certification shall accompany the submission of the design documents along with names and disciplines for the designers of record. This design certification shall include a list of deviations (variations) from the solicitation or accepted final design. Prepare the design certification and transmittal letter in the format shown on Attachment A included at the end of this section.

3.5 60 PERCENT DESIGN SUBMITTALS

See Section 01336 60 PERCENT DESIGN REQUIREMENTS.

3.6 100 PERCENT DESIGN SUBMITTALS

See Section 01338 100 PERCENT DESIGN REQUIREMENTS.

3.7 REVIEW BY GOVERNMENT AGENCIES

3.7.1 Distribution of Design Documents for Conformance Review

(a) Government agencies shall receive review documents thirty (30) days prior to review conferences. The documents will be in their then-present "on-board" design status (except for the 100% design submittal). Agencies reviewing documents, and in the quantities indicated, are listed below. All documents must contain an index of contents. Work shall continue during the review period between the 60% design submission and the 60% design review conference. Work shall be 100% complete when the 100% design is submitted. Design work shall not continue during the review period between the 100% design submission and the 100% design review conference. All submittals shall be transmitted by express mail. Originals of transmittal letters should be sent to the Omaha District and copies should accompany each mail package. Transmittal letters shall indicate distribution by use of the "ATTN" code shown in the address. Design document set shall include the items listed below. Some of the Construction submittals are also listed. Design submittals shall be submitted as a complete package. The distribution listed below also applies to all design reviews and design package accepted for construction.

(b) If the Government requires more time than the thirty (30) days given, prior to either of the review conferences, the Contractor will be granted an extension of time equal to the number of calendar days of delay.

3.7.1.1 Submittal Items

The submittal items listed below are intended to identify the different design submittals required throughout the design process and select submittals required during and at the completion of Construction. Each submittal item has an Abbreviation, which will be used in conjunction with the number of required copies. See paragraphs 3.7.1.3 through 3.7.1.7 for required copies for distribution.

SUBMITTAL ITEM - ABBREVIATION

Design Analysis Narrative - **DANar**

Design Analysis Calculations - **DACalcs**

Specifications - **Specs**

Specification Error Reports - **SpecER**

Submittal Register - **SubReg**

Drawings (1/2 size) - **Dwg-1/2**

Drawings (Full size) - **Dwg-full**

Meeting Minutes with Annotated Comments and Other Attachments - **MMin**

As-Built Drawings - **Asblt**

Electronic Media Drawings - **EMDwg**

Electronic Media Specifications - **EMSpecs**

Electronic Media Design Analysis - **EMDA**

Design Certification Letter - **DCLet**

Color Board - **ColBd**

DD Form 1354 - Transfer and Acceptance of Military Real Property - **DD1354**

Environmental Protection Plan - **EP Plan**

Engineering Considerations and Instructions - **ECI**
Renderings - **Reud**
Comprehensive Interior Design - **CID**

3.7.1.2 Activity Distribution Addresses

Project Management/Engineering Divisions
Attn: CENWO-PM-M (Michael Armstrong)
US Army Engineer District, Omaha
106 South 15th Street
Omaha, NE 68102-1618
Tele. No. (402) 221-3981

Project Management-Forward
Attn: CENWO-PM-FP (William Gust)
771 Goodfellow Street, Bldg 1319
Peterson AFB, CO 80914-2740
Tele. No. (719) 5564184

Construction Division
Attn: CENWO-CD-QT (Robert Matya)
US Army Engineer District, Omaha
106 South 15th Street
Omaha, NE 68102-1618
Tele. No. (402) 221-4161

Rocky Mountain Area Engineer
Attn: CENWO-CD-RM (Robert Michaels)
US Army Corps of Engineers,
Rocky Mountain Area Office
1050 South Academy Boulevard, Suite 100
Colorado Springs, CO 80910
Tele. No. (719) 570-7797

Academy Resident Engineer
Attn: CENWO-CD-RM-Y (Sam Parker)
US Army Corps of Engineers,
Rocky Mountain Area Office
1050 South Academy Boulevard, Suite 100
Colorado Springs, CO 80910
Tele. No. (719) 570-7797

Schriever AFB Project Office
Attn: CENWO-CD-RM-Y/Schriever AFB Project Office
(Sam Parker/Larry Redmond)
US Army Corps of Engineers,
Rocky Mountain Area Office
1050 South Academy Boulevard, Suite 100
Colorado Springs, CO 80910
Tele. No. (719) 570-7797

US Army Engineering & Support Center
Humphreys Engineering Center
ATTN: CEHNC-MX (Paul Hanreeder)
7701 Telegraph Road, Room 2A-16
Alexandria, VA 22315-3813
Tele. No. (703) 428-9139

Headquarters, Air Force Space Command

Attn: HQ, AFSPC/CECE (CAPT Randy Boswell)
150 Vandenberg Street, Suite 1105
Peterson AFB, CO 80914-4150
Tele. No. (719) 554-3365

50th Civil Engineering Squadron
Attn: 50 CES/CECC (Craig Highsmith)
300 O'Malley Avenue, Suite 19
Schriever AFB, CO 80912-5019
Tele. No. (719) 567-5073

Headquarters, Air Force Center for Environmental Excellence
Attn: HQ, AFCEE/DCM (Thomas Hodges)
8107 13th Street (Bldg. 728)
Brooks AFB, TX 78235-5218
Tele. No. (210) 536-3588

Headquarters, Air Force Medical Services Support Agency
Attn: HQ, AFMSA/SGMF (CAPT Thomas Beranek)
5201 Leesburg Pike
Falls Church, VA 22041
Tele. No. (703) 681-4445, Ext.3021

Air Force Health Facilities Office - Western Region
Attn: AFELM HFO-WR (LT Matt Sakal)
333 Market Street, Suite 650
San Francisco, CA 94105-2196
Tele. No. (415) 977-8867

USAF Dental Investigation Service
Attn: DETACH 1/USAF SAM (Col Gregory Browning)
310 C "B" Street, Bldg. 1H
Great Lakes, IL 60088-5259
Tele. No. (847) 688-7607

10th Medical Group
Attn: 10 MDG/SGSLF (Bruce White)
4102 Pinion Drive
US Air Force Academy, CO 80840
Tele. No. (719) 333-5116

US Army Corps of Engineers Northwest Division
Attn: CENWD-MT-MM (Donald Schindler)
220 SW 8th Avenue
Portland, Oregon 97209
Tele. No. (503) 808-3747

3.7.1.3 60 Percent Design Distribution

See paragraphs above explaining Submittal Abbreviation Codes and Activity Distribution Addresses. The number of copies required for each submittal item are listed below.

Activity CENWO-PM-M CENWO-PM-FP CENWO-CD-QT CENWO-CD-RM CENWO-CD-RM-Y

Submittal
Item

DANar-	5	1	2	2	1
DACalcs-	5	1	2	2	1
Specs-*(1)	5	1	2	2	1
Dwg-1/2-	5	1	2	2	1
Mmin-*(2)	5	1	2	2	1
EMDwg-*(3)	2	-	-	-	-
DCLet-	5	1	1	2	1
ColBd-	2	-	-	1*(5)	1*(5)
CID-	3	-	-	-	1
EP Plan-	2	1	1	1	1
CD of Built Acrobat PDF (Plans/Specs/DA/Calcs) *(4)	3	1	1	1	1

Activity CENWO-CD-RM-Y CEHNC-MX HQ, AFSPC/CECE 50 CES/CECC HQ, AFCEE/DCM
(SCHRIEVER PO)

Submittal
Item

DANar-	2	2	1	4	1
DACalcs-	2	2	1	2	1
Specs-*(1)	2	2	1	4	1
Dwg-1/2-	2	2	1	4	1
Mmin-*(2)	2	2	1	4	1
DCLet-	1	2	1	4	1
ColBd-	1	1*(5)	1*(5)	1	1*(5)
EP Plan-	1	1	1	1	1
CID-	1	1	1	2	1
CD of Built Acrobat PDF(Plans/Specs/DA/Calcs)* (4)	1	2	1	2	1

Activity HQ, AFMSA/SGMF AFELM HFO-WR DETACH 1/USAFSAM 10 MDG/SGSLF

Submittal
Item

DANar-	1	1	1	1
DACalcs-	1	1	1	1
Specs-*(1)	1	1	1	1
Dwg-1/2-	1	1	1	1
Mmin-*(2)	1	1	1	1
DCLet-	1	1	1	1
ColBd-	1*(5)	1	1*(5)	1*(5)
EP Plan-	1	1	1	1
CID-	1	1	1	1
CD of Built Acrobat PDF(Plans/Specs/DA/Calcs)* (4)	1	1	1	1

Activity CENWD-MT-MM

Submittal
Item

DANar-	-
DACalcs-	-
Specs-*(1)	-
Dwg-1/2-	-
Mmin-*(2)	-
DCLet-	1
ColBd-	-
EP Plan-	-
CID-	-
CD of Built Acrobat	
PDF(Plans/Specs/	
DA/Calcs)* (4)	1

*60 PERCENT SUBMITTAL NOTES:

Specific submittal requirements are identified in Sections 01332 and 01336

*(1) Copy shall show deletions and insertions (Revisions On) for all UFGS and designated CEGS specifications submitted. Process and Print Options for each section furnished shall include the following minimum requirements: Under "Sections" Print/Process Sections and Renumber Paragraphs boxes are checked; Under "Reports" a Section Table of Contents (Include Without Scope and Combine sections and section tables of contents); Under "Options" Section Dates shown, Units of Measure as metric, Tags are Hidden, Notes are hidden, Revisions are shown, Start Page Numbering with "1", and Restart for each section box is checked; and Under "Header/Footer" jobtitle and jobname as a Header and Section number and Page number as a footer (similar to format shown on this section of the RFP).

*(2) To be submitted after Review Conference per requirements of this section.

*(3) Electronic Media Drawings (.dwg files):
Fifteen (15) percent of all drawings, representative of all design disciplines, shall be submitted in AutoCAD 2000 on CD-ROM to verify that the CADD standards being specified are complied with.

*(4) See Paragraph 3.7.1.8, Design Submittal CD-ROM

*(5) Provide only a photo of the colorboard.

3.7.1.4 100 Percent Design Distribution

See paragraphs above explaining Submittal Abbreviation Codes and Activity Distribution Addresses. The number of copies required for each submittal item are listed below.

Activity CENWO-PM-M CENWO-PM-FP CENWO-CD-QT CENWO-CD-RM CENWO-CD-RM-Y

Submittal
Item

DANar-	5	1	2	2	1
DACalcs-	5	1	2	2	1
Specs-*(1)	5	1	2	2	1
Dwg-1/2-	5	1	2	2	1
Mmin-*(2)	5	1	2	2	1
EMDwg-*(3)	2	-	-	-	-
DCLet-	5	1	1	2	1
ColBd-	2*(4)	-	-	1*(6)	1*(6)
CID-	3	-	-	-	1
EP Plan-	2	1	1	1	1
ECI	2			1	1
CD of Built Acrobat					
PDF(Plans/Specs/					
DA/Calcs)*(5)	3	1	1	1	1

Activity CENWO-CD-RM-Y CEHNC-MX HQ, AFSPC/CECE 50 CES/CECC HQ, AFCEE/DCM
(SCHRIEVER PO)

Submittal
Item

DANar-	2	2	1	4	1
DACalcs-	2	2	1	3	1
Specs-*(1)	2	2	1	4	1
Dwg-1/2-	2	2	1	4	1
Mmin-*(2)	2	2	1	4	1
DCLet-	1	2	1	4	1
ColBd-	1*(4)	1*(6)	1*(6)	1*(4)	1*(6)
EP Plan-	1	1	1	1	1
CID-	1	1	2	1	1
ECI	1	-	-	1	1
CD of Built Acrobat					
PDF(Plans/Specs/					
DA/Calcs)*(5)	1	2	1	2	1

Activity HQ, AFMSA/SGMF AFELM HFO-WR DETACH 1/USAFSAM 10 MDG/SGSLF

Submittal
Item

DANar-	1	1	1	1
DACalcs-	1	1	1	1
Specs-*(1)	1	1	1	1
Dwg-1/2-	1	1	1	1
Mmin-*(2)	1	1	1	1
DCLet-	1	1	1	1
ColBd-	1*(6)	1*(4)	1*(6)	1*(6)
EP Plan-	1	1	1	1
CID-	1	1	1	1
CD of Built Acrobat				
PDF(Plans/Specs/				
DA/Calcs)*(5)	1	1	1	1

Activity CENWD-MT-MM

Submittal
Item

DANar-	-
DACalcs-	-
Specs-*(1)	-
Dwg-1/2-	-
Mmin-*(2)	-
DCLet-	1
ColBd-	-
EP Plan-	-
CID-	-
CD of Built Acrobat	
PDF(Plans/Specs/	
DA/Calcs)* (5)	1

*100 PERCENT SUBMITTAL NOTES:

Specific Submittal requirements are addressed in Section 01332 and 01338.

*(1) Copy shall show deletions and insertions (Revisions On) for all UFGS and designated CEGS specifications submitted. Process and Print Options for each section furnished shall include the following minimum requirements: Under "Sections" Reconcile References, Print/Process Sections and Renumber Paragraphs boxes are checked; Under "Reports" a Section Table of Contents (Include Without Scope and Combine sections and section tables of contents), and Reference Verification, Submittal Verification, Reference Verification, Submittal Verification, Bracket Verification, Section Verification and Submittal Register boxes are checked; Under "Options" Section Dates shown, Units of Measure as metric, Tags are Hidden, Notes are hidden, Revisions are shown, Start Page Numbering with "1", and Restart for each section box is checked; and Under "Header/Footer" jobtitle and jobname as a Header and Section number and Page number as a footer (similar to format shown on this section of the RFP).

*(2) To be submitted after Review Conference per requirements of this section.

*(3) Electronic Media Drawings (.dwg files):

Fifteen (15) percent of all drawings, representative of all design disciplines, shall be submitted in AutoCAD 2000 on CD-ROM to verify that the CADD standards being specified are complied with.

*(4) Color boards shall show actual color samples of all proposed exterior and interior finishes.

*(5) See Paragraph 3.7.1.8, Design Submittal CD-ROM.

*(6) Provide only a photo of the colorboard.

3.7.1.5 100 Percent Corrected Design Set (For Construction)

The 100 Percent Corrected Design set shall include the incorporation of all changes agreed to and made throughout the entire design segments. The design shall be complete and the drawings shall be considered ready for construction use.

See paragraphs above explaining Submittal Abbreviation Codes and Activity Distribution Addresses.

Activity CENWO-PM-M CENWO-PM-FP CENWO-CD-QT CENWO-CD-RM CENWO-CD-RM-Y

Submittal

Item

DANar-	5	1	2	4	1
DACalcs-	3	1	2	2	1
Specs-*(1)	5	1	2	4	1
Dwg-1/2-	5	1	2	4	1
Dwg-full	-	-	-	1*(2)	-
Mmin-*(3)	5	1	2	4	1
EMDwg-*(4)	2	-	-	-	-
EMSpecs-*(4)	2	-	-	-	-
EMDA-*(4)	2	-	-	-	-
DCLet-	5	1	1	4	1
ColBd-	2*(5)	-	-	1*(8)	1*(8)
CID-*(6)	3	-	-	-	1
EP Plan-	2	1	1	1	1
ECI	-	-	1	1	1
CD of Built Acrobat					
PDF(Plans/Specs/					
DA/Calcs)*(7)	3	1	1	1	1

<u>Activity</u>	<u>CENWO-CD-RM-Y</u>	<u>CEHNC-MX</u>	<u>HQ, AFSPC/CECE</u>	<u>50 CES/CECC</u>	<u>HQ, AFCEE/DCM</u>
	<u>(SCHRIEVER PO)</u>				

SubmittalItem

DANar-	2	2	1	4	1
DACalcs-	2	2	1	3	1
Specs-*(1)	2	2	1	4	1
Dwg-1/2-	2	2	1	4	1
Dwg-full	-	-	-	1*(2)	-
Mmin-*(3)	2	2	1	4	1
DCLet-	1	2	1	4	1
ColBd-	1*(5)	1*(8)	1*(8)	1*(5)	1*(8)
CID-*(6)	1	1	1	1	1
EP Plan-	1	1	1	1	1
ECI	1	-	-	-	-
CD of Built Acrobat					
PDF(Plans/Specs/					
DA/Calcs)*(7)	1	2	1	2	1

Activity HQ, AFMSA/SGMF AFELM HFO-WR DETACH 1/USAFSAM 10 MDG/SGSLF

Submittal
Item

DANar-	1	1	1	1
DACalcs-	1	1	1	1
Specs-*(1)	1	1	1	1
Dwg-1/2-	1	1	1	1
Mmin-*(3)	1	1	1	1
DCLet-	1	1	1	1
ColBd-	1*(8)	1*(5)	1*(8)	1*(8)
CID-*(6)	1	1	1	1
EP Plan-	1	1	1	1
CD of Built Acrobat PDF(Plans/Specs/ DA/Calcs)* (7)	1	1	1	1

Activity CENWD-MT-MM

Submittal
Item *(4)

DANar-	-
DACalcs-	-
Specs-*(1)	-
Dwg-1/2-	-
Mmin-*(3)	-
DCLet-	1
ColBd-	-
EP Plan-	-
CID-	-
CD of Built Acrobat PDF(Plans/Specs/ DA/Calcs)* (7)	1

*100 PERCENT CORRECTED SUBMITTAL NOTES:

Specific Submittal requirements are addressed in Section 01332 and 01338.

*(1) Copy shall show revisions executed (deletions removed and insertions markings removed) for all specification sections submitted. Process and Print Options for each section furnished shall include the following minimum requirements: Under "Sections" Reconcile References and Addresses, Print/Process Sections and Renumber Paragraphs boxes are checked; Under "Reports" a Section Table of Contents (Include Without Scope and Combine sections and section tables of contents), and Reference Verification, Submittal Verification, Reference Verification, Submittal Verification, Bracket Verification, Section Verification and Submittal Register boxes are checked; Under "Options" Section Dates shown, Units of Measure as metric, Tags are Hidden, Notes are hidden, Revisions are hidden, Start Page Numbering with "1", and Restart for each section box is checked; and Under "Header/Footer" jobtitle and jobname as a Header and Section number and Page number as a footer (similar to format shown on this section of the RFP).

*(2) Each drawing sheet shall be stamped (P.E.) by the appropriate Designer.

*(3) To be submitted after Review Conference per requirements of this section.

*(4) Electronic Media Drawings: (.dwg files) in AutoCAD 2000, Electronic

Media Specifications (Specsintact), and Electronic Media Design Analysis MS Word (compatible with MS Word 97) and Adobe Acrobat 5.0. The Design Analysis Calculations shall be included with the design analysis narrative and shall be scanned and saved in Adobe Acrobat 5.0. The design analysis and calculations shall utilize bookmarks for each chapter of the design analysis and each appendix or calculations.

Electronic Media shall be on CD-ROM (Recordable compact disk with minimum 650 megabyte capacity).

*(5) Color Boards are not required if there are no changes from the previous design submittal and if only minor changes are required, submit applicable coded samples (with tape ready for application) and corrected color legend. If major changes to the color board are required, resubmit the Color boards with actual color samples of all proposed exterior and interior finishes and revised corrected color legend.

*(6) If minor changes to the CID are required, submit corrected sheets for installation into binder. If major changes to CID are required, resubmit entire CID in final form.

*(7) See Paragraph 3.7.1.8, Design Submittal CD-ROM.

*(8) Provide only a photo of the colorboard if changes from previous were made.

3.7.1.6 Not Used

3.7.1.7 As-Built Submittals

See paragraphs above explaining Submittal Abbreviation Codes and Activity Distribution Addresses. The number of copies required for each submittal item are listed below.

Asblt-	*	-	-	-
DD1354-	1	1	1	1

Asblt-	-	-	-	-	-
DD1354-	1	-	-	1	-

*NOTES for As-Built Submittals:

*See Section 01040, AS-BUILT DRAWINGS for requirements and procedure.

3.7.1.8 Design Submittal CD-ROM

The design-build Contractor shall provide, along with hardcopies, CD-ROMs containing design analysis, design analysis calculations and appendices, drawings, specifications, submittal register, design certification letter, and engineering considerations and instructions in an Adobe Acrobat 5.0.pdf format. The CD-ROMs shall be mailed in the designated number of hardcopies to the agencies listed above. CD-ROMs shall utilize bookmarks with titles, which ease the review of the design. Each design submittal item and submittal item components shall be made easy to find (i.e. each specification section, chapters and appendices of design analysis, and each submittal item).

3.7.2 Review Comments:

For each design review submittal, the Contractor will be furnished comments from Omaha District and other agencies involved in the review process approximately 21 days after receipt and review conference will be held approximately 30 days after receipt. If the Contractor disagrees technically with any comment or comments and does not intend to comply with the comment, he/she shall clearly outline, with justification reasons for noncompliance at the design review conference in order that the comments can be resolved. Annotated comments, including the disposition of all comments shall be furnished in writing by the Contractor within five (5) days of the review conference and shall be recorded in the Contractor prepared Meeting Minutes described in paragraph 3.7.6.1. The written documentation shall be forwarded in the same quantities to the distribution list shown in paragraph: "Distribution of Design Documents for Conformance Review" above.

3.7.3 Using Automated Review Management System:

Conference and post conference action: Government personnel, from the above Government Agencies, will present review comments for discussion and resolution. Copies of comments, annotated with comment action agreed on, will be made available to all parties before the conference adjourns. Unresolved problems will be resolved by immediate follow-on action at the

end of conferences. Valid comments will be incorporated. After receipt of final corrected design documents upon incorporation of all backcheck comments (as many backchecks as are deemed necessary by the Government will be conducted), the Omaha District will recommend acceptance to proceed with construction. The Government intends to utilize the Dr. Checks review system, which is available at: <http://65.204.17.188/projnet/home/version1/index.cfm>, for processing review comments and responses. Access rights will be provided to the Design-Build Contractor after contract award. The Government, however, reserves the right to not accept design document submittals and withhold design payments, if comments are of too great a significance. In this case, every effort shall be made during follow-up action between the Contractor and the Omaha District to resolve conflicts and problems such that documents can be fully accepted. However, if final submittal(s) are incomplete or deficient, requiring correction by the Contractor and resubmittal for review, the cost of rehandling and reviewing will be deducted from payment due the Contractor at the rate of \$1000.00 (for each design discipline requiring resubmittal) per submittal. "Design Disciplines" in this paragraph consist of Architectural, Structural, Interior Design, Mechanical, Electrical, Civil/Site work, and Fire Protection.

3.7.4 Delays

Delays caused by the Contractor in completion of the 60 percent design, the 100 percent design or the 100 percent corrected design will not be considered as valid reason to delay completion of the entire design. The Government may not be held liable for delays caused by re-submittal efforts caused by designs submitted, which are rejected by the reviewers.

3.7.5 100% Corrected Design Reproduction Set (For Construction Use)

Since the Government will allow the Contractor to proceed with construction based on the possibility of pending revision(s), (i.e. design aspects agreed to after review of the 100% design set and found to be absent in the 100% corrected set for construction), no payment will be made for any in-place construction related to the pending revision(s) until the agreed to design revision(s) is incorporated into the drawings for construction use.

The Cover Sheet of the Contractor prepared drawings shall bear the stamp or seal and signature of the registered architect or appropriate engineer responsible for the work and proposed to meet the RFP requirements. The date on each drawing shall reflect the month and year that the drawings were cleared for the purposes of beginning construction. The Cover Sheet of the drawings, Cover Sheet of the Specifications, and Cover Sheet of the Design Analysis shall include the date that the design documents were cleared for the purposes of beginning construction. The Contractor shall provide corrected 100 percent specifications in both hard copy and electronic media (Specsintact Software Version 3.1.328 or later). The originals will be retained by the Contractor for recording of as-built conditions. Upon completion of the project, the accepted design documents corrected to reflect as-built conditions shall be supplied to the Government. See Section 01040 AS-BUILT DRAWINGS for as-built drawing requirements.

3.7.6 Government Design Review and Acceptance

3.7.6.1 Design Review Conference and Post-Design Review Conference Action:

All design review conferences will be held at Schriever AFB. Government personnel will forward review comments to the Contractor for discussion and resolution prior to the design review conference. Copies of comments, annotated with comment action agreed on, will be made available to all parties before the design review conference adjourns. Unresolved problems will be resolved by immediate follow-on action at end of conferences. Valid comments will be incorporated. Upon satisfactory Government review of the 100 percent corrected design documents, the Omaha District will formally provide Government acceptance necessary to initiate construction. The Government, however, reserves the right to not accept design document submittals and to withhold design payments, if comments are of too great a significance. In this case, every effort shall be made during follow-up action between the Contractor and the Omaha District to resolve conflicts and problems such that documents can be fully accepted. However, if final submittal(s) are incomplete or deficient, requiring correction by the Contractor and resubmittal for review, the cost of rehandling and reviewing will be deducted from payment due the Contractor at the rate of \$1000.00 (for each design discipline requiring resubmittal) per submittal. The Contractor shall submit to the Contracting Officer within five (5) calendar days, two two (2) copies of meeting minutes summarizing major decision points and issues which requires resolution and the action office. Annotated comments shall be attached to these minutes.

3.7.6.2 Complete Design Documents

The Contractor shall submit complete design documents in the same quantity and to the same offices listed above in paragraph "**Distribution of Design Documents for Conformance Review**", for each corrected 100 percent design submittal (one or more) until the Government is satisfied that all review comments have been addressed and resolved.

3.7.6.3 Accuracy and Completeness of Design

Reviews by the Government of the design documents shall not be construed to be an endorsement of the accuracy or completeness of the design. Design deficiencies or omissions in the accepted design shall be the responsibility of the Contractor.

3.7.7 DD Form 1354, Transfer and Acceptance of Military Real Property

The Contractor shall provide, for acceptance, a completed DD Form 1354 "Transfer and Acceptance of Military Real Property" (Copy attached at the end of this section) with the 100 percent corrected design documents. DD Form 1354 shall be filled out in accordance with Draft Army Pamphlet 405-45 "Real Property Inventory Management", Table B-16 "Preparation of DD Form 1354" (Copy attached) and Army Pamphlet 415-28 "Guide to Army Real Property Codes" (Copy is available at the following website: <http://www.usapa.army.mil/gils/>). The number of copies of the completed DD Form 1354 shall be same as that required for the 100 percent corrected design documents.

3.8 REVISIONS TO THE ACCEPTED DESIGN

(a) The accepted design will be used by all parties involved in construction and in administration of the contract. Therefore, it is

imperative that the design documents be kept up to date and an effective system of making and distributing changes be implemented. Since changes to the design increase risk of construction errors and deplete available administrative resources, every effort shall be made to minimize revisions to the accepted design. One of the measures of the Contractor's effectiveness of management will be how well the goal of minimizing changes to the accepted design is met. The use of effective quality control during design, and utilization of experienced and capable designers are some of the means that are expected to be used to accomplish this goal.

(b) If revisions to the accepted design become necessary, the procedures described in Section 01330 SUBMITTAL PROCEDURES will be used to accomplish the revisions. The revisions will be considered a "Variation" and shall be submitted as a "G-RE" submittal. All the requirements in paragraph: "Variations" in Section 01330 SUBMITTAL PROCEDURES will apply to revisions to the accepted design. All design analysis and calculations necessary to establish that the proposed revision satisfies applicable design requirements shall be included in the submittal.

Attachment A

[Contractor's Letterhead]

[Date: _____]
[Contract No. _____]

[Reviewing Component Address]

Subj: DESIGN CERTIFICATION AND TRANSMITTAL FOR
[Project Title _____]
[Project Location _____]
[Contract No. _____]

Gentlemen

Enclosed are the following documents, which I hereby certify are in compliance with the RFP requirements of the subject construction contract and can be used to commence construction subject to Government approval:

1. Design Drawings
2. Project Specification
3. Design Analysis
 - a. Civil
 - b. Water Supply and Wastewater Collection
 - c. Architectural
 - d. Interior Design
 - e. Structural
 - f. Mechanical
 - g. Fire Protection
 - h. Electrical
 - i. Environmental Protection, Compliance and Permits
 - j. Health and Safety
 - k. Sustainable Design
4. Submittals Register

[Typed Name and Signature of an
Officer of the Contractor's Company]

5. All other Design Submittals
6. Deviations

Copy to:
[As standard with the Contractor]

-- End of Section --

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY														Form Approved OMB No. 0704-0188			
PAGE OF PAGES																	
Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, Va 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.																	
1. FROM (Installation/Activity/Service and Zip code)				2. OPERATING UNIT		3. DISTRICT CODE		4. OPERATING AGENCY		5. DATE		6. JOB NUMBER		7. SERIAL NUMBER		8. CONTRACT NUMBER	
9. TO (Installation/Activity/Service and Zip code)				10. OPERATING UNIT		11. DISTRICT CODE		12. OPERATING AGENCY		13. ACCOUNTING NUMBER		14. ACCOUNTABLE OFFICE NUMBER		15. TYPE OF TRANSACTION		16. PROJECT NUMBER	
														A. <input type="checkbox"/> NEW CONSTR. <input type="checkbox"/> EXISTING FAC. <input type="checkbox"/> CAPITAL IMP. <input type="checkbox"/> OTHER (Specify)		B. <input type="checkbox"/> BENF/O <input type="checkbox"/> PHYSICAL COM. <input type="checkbox"/> FINAN. COM. <input type="checkbox"/> OTHER (Specify)	
ITEM NO. 17	CATEGORY CODE 18	FACILITY (Category description) 19		NO. OF UNITS 20	TYPE 21	UNIT OF MEAS. 22	TOTAL QUANTITY 23		COST 24		DRAWING NUMBERS 25		REMARKS 26				
27. STATEMENT OF COMPLETION: The facilities listed hereon are in accordance with maps, drawings, and specifications and change orders approved by the authorized representative of the using agency except for the deficiencies listed on the reverse side.										28. ACCEPTED BY (Signature)					DATE		
TRANSFERRED BY (Signature)					DATE					TITLE (Post Engr./Base Civ. Engr./Navy Rep.)					29. PROPERTY VOUCHER NUMBER		
TITLE (Area Engr./Base Engr./DPWO)																	

30.

CONSTRUCTION DEFICIENCIES

31. REMARKS

INSTRUCTIONS

This form has been designed and issued for use in connection with the transfer of military real property between the military departments and to or from other government agencies. It supersedes ENG Forms 290 and 290B (formerly used by the Army and Air Force) and NAVDOCKS Form 2317 (formerly used by the Navy).

Existing instructions issued by the military departments relative to the preparation of the three superseded forms are applicable to this form to the

extent that the various items and columns on the superseded forms have been retained. Additional instructions, as appropriate, will be promulgated by the military departments in connection with any new items appearing hereon.

With the issuance of this DD form, it is not intended that the departments shall revise and reprint manuals and directives simply to show the number of this DD form. Such action can be accomplished through the normal course of revision for other reasons.

Draft Department of the Army Pamphlet 405-45

Real Property Inventory Management

Table B-16, Preparation of DD Form 1354

THIS PAGE IS LEFT BLANK INTENTIONALLY

Hammerhead

Gang latrine style constructed mid-1950s to mid-1960s. Has company dining facility at one end, giving T-, or hammer, shape to building.

H-Shape

Gang latrine style constructed in 1950s. Two main sections with connecting piece most commonly constructed in shape of letter H. Sometimes in shape of letter A.

Historic Permanent construction before 1950 (perhaps all were before 1940).

Any permanent construction preceding H-shape.

Other

Post-1950 permanent construction not included in above list

Table B-16

Preparation of DD Form 1354 (Transfer & Acceptance of Military Real Property)

Upon receiving information on a DD Form 1354 the real property office will enter the information in the appropriate fields/screens in the automated real property system. The voucher register will be updated with the information and the DD Form 1354 filed in the real property records.

Purpose. This table provides the procedures for completing DD Form 1354 (Transfer and Acceptance of Military Real Property) by all responsible parties. A DD Form 1354 will be prepared for transfer of construction by the District Engineer, transfer of construction accomplished by the designated facility engineer, acquisitions, construction, disposal, purchased or leased real property, reactivation of excess installations, transfers of real property of non-appropriated fund or non-Army agencies to the government, transfers of accountability for usable research and development and acceptance of other construction, and any other real property accountability action.

Detailed Instructions. DD Form 1354 will be filled in as

follows:

1. From: This block will include the name of the transferring agency: organization, installation, division, etc. It will also include the address and zip code. This information is for those performing the work or making the transfer.

2. Operating Unit: For other than Army use.

3. District Code: For other than Army use.

4. Operating Agency: For other than Army use.

5. Date: This is the preparation date of the DD Form 1354.

6. Job Number: The job number depends on who initiates the job. If the Director of Engineering and Housing (DEH) or the Director of Public Works (DPW) initiates the job then they will put a job number in this block and it will relate to a special project (for contract) or a DA 4283 job order (in house).

7. Serial Number: This is the voucher number at source, e.g., DPW, COE.

8. Contract Number: If a project has been let to a contractor then the contract number will be that assigned by the contracting office in the Director of Contracting or the District Engineer contracting office.

9. To: This will include the name of the receiving organization, installation, division, etc. where the work has been performed or where the transfer has been made. The address and zip code will also be included.

-

10. **Operating Unit:** Other than Army Use.

11. **District Code:** Other than Army use.

12. **Operating Agency:** Other than Army Use.

13. **Accounting Number:** Other than Army Use.

14. **Accountable Officer Number:** Other than Army Use.

15. **Type of Transaction:** This will identify whether it is new construction, capital improvement or other. It will also indicate whether it is the final cost of the project, beneficial occupancy or physical completion. The District Engineer or in house project officer must indicate on the DD Form 1354 whether cost shown is preliminary (for Beneficial Occupancy/Physical Completion DD Forms 1354) or final cost. If it is a preliminary (estimated cost) the real property officer will create a suspense file to ensure that the district furnishes an updated DD Form 1354 with final construction cost. Update to the database should be handled accordingly. Final costs may take several years if legal claims are involved.

a. Block A: Insert an 'X' in the appropriate box of block A to indicate whether the transaction involves new construction, transfer of existing facilities or capital improvements to existing facilities. If the "Other" box is used, explain the transaction in Item 31, "Remarks" on the back of the DD Form 1354.

b. Block B: If block A has been checked for new construction then use this block to indicate whether transaction is being made at time of beneficial occupancy, physical completion, or financial completion. If the "Other" box is used, explain the transaction in Item 31, "Remarks" on the back of the DD Form 1354.

16. **Project Number:** Enter the project number and code number assigned to identify the project. For construction,

enter the public law authorizing the work.

17. Item Number: Identify each entry on the DD Form 1354 by giving it an item number. Each portion of a facility with a unique DA PAM 415-28 category code must be identified with a separate line number.

18. Category Code: This column will identify the five-digit design use category code associated with the design of the facility as indicated in the DA PAM 415-28. Each facility may have more than one design use; however, they must be identified as separate items in block 17.

19. Facility (Category Description): The description for the facility will be entered as it relates to the category short title in the DA PAM 415-28. Each facility number should be identified in this field as it relates to the construction.

20. Number of Units: Self-explanatory.

21. Type: This will indicate the type of construction: "P" = Permanent, "T" = Temporary and "S" = Semi-permanent.

22. Unit of Measure UM1, UM2: This indicates the gross area or capacity of a facility as it relates to the design use category code of the facility. See DA PAM 415-28.

23. Total Quantity: This indicates the total quantity of the facility as it relates to the unit of measure assigned to the facility: e.g., UM1 = square feet (SF), acres (AC) or square yards (SY), UM2 = each (EA), families (FA), etc.

24. Cost: Cost for each line item entry must be entered. All engineering, design and inspection costs associated with a project must also be captured on the DD Form 1354.

a. If the cost is the final cost figure for the line

item it will carry an alphabetical suffix of "F" indicating that it is a final cost. If the cost is preliminary it will contain a "P" indicating it to be a preliminary cost and not final.

b. If the cost is a capital improvement to an existing facility previously accounted for, enter only the amount which will increase the cost of the real property, i.e., enter the amount by which the general ledger balance is to be increased.

c. All engineering, design and inspection costs will be entered on the DD Form 1354 for the real property office to capitalize as project costs. These will be identified as a separate entry.

Types of funds are mandatory and will be shown in column 24 or column 26 (i.e.: MCA, Housing, and NAF).

25. Drawing Number: Indicates the number assigned to a particular drawing of a construction project as it relates to the different components to a facility: the architectural drawing would be number one, the plumbing would be number two, etc. Using the old manual system the drawing numbers would relate to each page of the project, however, now that the automated system of CADD is operational at many installations this is not the case.

26. Remarks: Self-evident. This field may be used to note any information about the drawing numbers, project number, reason for the DD Form 1354: change in unit of measure, reason for increase/decrease in cost, etc.

--

27. Statement of Completion: Indicates the signature/title of the individual responsible for the transfer of the facility/equipment. The date is self explanatory, however, the date must be prior to or the same as the date of acceptance in item 28 on the 1354.

28. Accepted By: Indicates the signature/title of the individual responsible for accepting the transfer of such properties. The date is self-explanatory.

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29. Property Voucher Number: This number will be assigned sequentially by the receiving real property office to indicate the voucher occurrence that the transaction was accepted/vouchered.

Example: V123-90, This indicates that this is the 123rd voucher for FY 90. When an installation transfers from one to another, the losing installation fills in block 7 and the gaining block 29.

30. Construction Deficiencies: This should indicate any deficiencies of the design or construction of the project.

31. Remarks: Self-explanatory. If the "Other" box is checked in item 15 an explanation should be noted in the "Remarks" column.

SECTION 01336

60 PERCENT DESIGN REQUIREMENTS

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PART 2 NOT USED.....39

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SECTION 01336

60 PERCENT DESIGN REQUIREMENTS

PART 1 60 PERCENT DESIGN SUBMITTALS

Attachments: Code Analysis
ADA Architectural Design Checklist

For general submittal requirements, see Section 01332 SUBMITTALS FOR DESIGN.

1.1 SITE PLANNING

1.1.1 Drawings

1.1.1.1 Location Plan and Vicinity Map

The Location Plan and Vicinity Map provided in the Request For Proposal (RFP) shall be updated as necessary and included in the drawings. The Location Plan shall include the Contractor's Access Route, Staging Area, and the Project Site.

1.1.1.2 Removal Plan

The removal plan will show the existing physical features and condition of the site before construction. Each physical feature to be removed shall be hatched as indicated on the standard legend sheet, a legend on the removal plan, and properly noted: to be removed, to remain, or to be relocated. The Removal Plan shall be prepared at the same drawing scale and use the sheet boundaries as the Site Plan.

1.1.1.3 Site Plan

The Site Plan shall show all the site layout information necessary to field locate the building, parking lots, roads, sidewalks, and all other appurtenances to be constructed as part of the project. All major site work to be constructed will be dimensioned for size and location. The Site Plan will identify all site-related items such as: curbs, pavements, walks, bollards, trash enclosures, retaining walls, chiller units, electrical transformers locations, etc. in accordance with a standard legend sheet or with additional legends or notes. Drawing scales of between 1:250, 1:300, and 1:400 are acceptable scales for the Site Plan. The contractor shall consider the project's construction area, drawing legibility, number of sheets required in choosing the drawing scale. The Site Plan, prior to adding the dimensions and notes, should serve as the base sheet to other Plans, such as: Utilities Plan, Grading and Drainage Plans and Landscape Plan. Existing and proposed contours or utility lines shall not be shown on Site Plan. Physical features that will remain after the proposed construction has been completed shall be shown. This plan, or the Location Plan, will also show any free zones, construction limits, etc. Whenever the Site Plan occupies more than one sheet of drawings, a Key Plan shall be included. Additional plans showing specific areas of the site in smaller scales can be included if more detail is necessary.

DESIGN AND CONSTRUCTION
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1.1.1.4 Site Details

The Contractor shall provide designs and details as necessary for site furnishings, accessories, accessible parking stalls and ramps, bollards, signage, striping, and any other site structure or item requiring a detail for clarity and construction accuracy.

1.1.1.5 Landscape Plan

A detailed Landscape Plan showing trees, shrubs, ground covers, seeded and sodded areas, shall be prepared by the Contractor. The Landscape Plan shall be prepared by a fully qualified, experienced professional Landscape Architect. The Contractor shall specify types of plant materials that are locally grown, commercially available and acclimated to the project environment. The Landscape Plan shall include a plant materials schedule or listing. This schedule shall include botanical names, common names, key, size and the method of transplanting. The Landscape Plan shall also show all unsurfaced ground areas disturbed by construction within the project limits with these areas shown to be seeded, sodded, or mulched as required.

1.1.1.6 Landscape Details

The Contractor shall verify the methods of planting to meet the project site/installation requirements and provide the necessary Landscape Details to perform the contract design work. Details shall reflect local practices and conditions for installation.

1.1.2 Specifications

Provide a listing by title and number of all Technical Specifications proposed for use in the final site design.

1.1.3 Design Analysis Narrative

Design analysis shall include the following:

1.1.3.1 Design References

Design references used in preparing the site design.

1.1.3.2 Basis, Specific Goals, Objectives and Priorities For Site Design

The Design Analysis should give the basis, specific goals, objectives and priorities for site design of the project. Identify, explain and document use of design criteria and how the design meets goals, objectives and priorities. Identify the preferred site development concept. Document pollution prevention measures and other environmental considerations made during design. The 60 percent Design Analysis must be approved and accepted before Final Design.

DESIGN AND CONSTRUCTION
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1.2 CIVIL

1.2.1 Drawings

1.2.1.1 Grading and Drainage Plan

A preliminary grading and drainage plan showing the proposed layout of all new culverts and roof drains shall be provided at the same scale as the site plan. Existing grading contours shall be indicated at 0.25-meter contour intervals. Tentative new grading contours shall be shown. Indicate proposed finished floor elevation of the new building. Provide location and description of benchmarks and indicate vertical and horizontal datums.

1.2.1.2 Typical Pavement Sections

Provide typical pavement and road sections and details showing interface between new and existing pavements and new pavements of different sections.

1.2.2 Specifications

Provide draft marked-up specifications of all Technical Specifications proposed for use in the final civil design.

1.2.3 Design Analysis Narrative

Design analysis shall include the following:

1.2.3.1 References

Design references used in preparing the civil design.

1.2.3.2 Grading

A narrative of the grading design and criteria used.

1.2.3.3 Pavements

A narrative of the pavement design and criteria used plus design calculations used to obtain the pavement design.

1.2.3.4 Drainage

A narrative of the drainage design and criteria used. Include information on the culvert pipe materials anticipated to be used.

1.2.3.5 Basis, Specific Goals, Objectives and Priorities For Civil Design

The Design Analysis should give the basis for the civil design and should establish specific goals, objectives and priorities for civil design of the project. Identify, explain and document use of design criteria and how the design meets goals, objectives and priorities. Identify the preferred site development concept. Document pollution prevention measures and other environmental considerations made during design. The 60 percent Design Analysis must be approved and accepted before Final Design.

DESIGN AND CONSTRUCTION
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SCHRIEVER AFB, CO
1.3 GEOTECHNICAL

See Civil and Structural Design Requirements.

1.4 WATER SUPPLY AND WASTEWATER

1.4.1 Drawings

1.4.1.1 Water Distribution and Sewage Collection Systems Plan (including building services)

Provide all existing utilities and above ground features which may pose as an obstacle (i.e., water, sewer, gas, electrical, etc.) on the basic site plan layout. Exclude siting notes and dimensions from the plan. Provide all proposed new water and sewer lines with preliminary sizes. This shall include all new service lines up to the 1.5 meter building line. Show the proposed locations of all new manholes, fire hydrants, valves (including PIV's), and connection points.

1.4.2 Specifications

Specifications shall be coordinated with the plans and include all items. Provide marked-up drafts of specifications proposed for the final. Provide a complete copy of special sections to cover those subjects for which no UFGS guide specifications are used or available.

1.4.3 Design Analysis Narrative

Design analysis shall include the following:

1.4.3.1 References

Provide design references used in preparing the water and wastewater design.

1.4.3.2 Water Supply and Distribution Systems

A narrative of the water supply and distribution systems design and applicable criteria used shall be provided. Include the peak and average domestic demands, the fire flow required and the available flow and residual pressures. A description of the water distribution system, a listing of allowable piping materials, hydrant flow test data and preliminary calculations necessary to support equipment, piping sizes, fire and domestic demands, etc., shall be provided.

1.4.3.3 Wastewater and Sewers

Based on existing information the sanitary sewer system in the vicinity of the proposed facility is assumed to be adequate to carry the flows expected to be generated by the new facility. A narrative of the wastewater supply design and applicable criteria used shall be provided. Include the preliminary calculations used to design the average and peak contributing flows. Field verify the available capacity and full flow capacity of the existing system to ensure that it will be adequate for the flows generated by the new facility. Include the available capacity and full flow capacity in the design analysis. Preliminary calculations necessary to support equipment and piping sizes and a listing of allowable piping materials shall be provided.

DESIGN AND CONSTRUCTION
MEDICAL/DENTAL CLINIC
SCHRIEVER AFB, CO

1.5 ARCHITECTURAL

1.5.1 Drawings

Sixty percent architectural drawing submittal shall be a complete set of architectural drawings without large scale details. All other drawings shall be complete except referencing of the large scale details.

1.5.1.1 Floor Plans

Provide a double line Floor Plan, drawn at the largest scale practicable to include the entire building on a single sheet. See paragraph on Drawing Scales for plan scale requirements. Floor plans shall essentially be complete with the exception of large scale detail referencing. Floor plans shall be scaled double-line drawings showing the functional arrangement, pocheing, location of all openings and plumbing fixtures, all section cuts, wall types, all notes and leaders, all general notes, and all dimensions shall be completed. The plans shall indicate door swings, door numbers and window type; door and window schedules are required. A north arrow shall be shown on each floor plan. Enlarged toilet and stair plans shall also be included. The first composite plan sheet shall include a gross area tabulation comparing the actual square meters with the authorized square meters of the facility. Architect-Engineer suggestions for plan improvement shall be fully shown and justified. Include the following:

- Overall, control, and door/window opening dimensioning.
- Match lines for combining individual portions of floor plans.
- Room names and numbers.
- Structural column or bay indicators.
- Wall and building section cuts.
- Door swings and door numbers.
- Window types.
- Area in square meters.
- General notes.
- All Floor and Wall Patterns/Borders.

When dimensioning, use arrowheads, not dots or slashes. Where major structural elements are included as parts of architectural detailing, do not indicate sizes. These elements should all be fully defined as part of the structural design documents. Major elements of mechanical and electrical equipment affecting room size or shape, shall be shown on the architectural plans to a practicable extent and coordinated with other respective disciplines. When applicable, Government-furnished, Contractor-installed, or Government-furnished and Government-installed items shall be shown as a dashed line.

1.5.1.2 Reflected Ceiling Plans

Reflected ceiling plans shall be complete including all electrical lights, mechanical supply and diffusers, notes, complete legends and pocheing of all materials to be used. See paragraph on Drawing Scales for reflected ceiling plan scale requirements.

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1.5.1.3 Roof Plan

Roof plans shall be complete including all notes, legends, slope indications, gutter and downspout locations, and roof overflow drains. All elements located on the roof shall be coordinated with all disciplines. See paragraph on Drawing Scales for roof plan scale requirements. Roof mounted equipment should be limited to exhaust fans, vents, and intakes, no large pieces of equipment shall be allowed to be mounted on the roof.

1.5.1.4 Building Elevations

Provide all building elevations complete showing the appearance and architectural treatment. Elevations shall be dimensioned to show total height, and relation to grade. Critical elevations such as top of finish floor, top of steel, etc. shall be indicated. All notes for materials shall be included. See paragraph on Drawing Scales for Exterior Building Elevation scale requirements.

1.5.1.5 Building Sections

Building cross section and longitudinal sections shall be included to show general interior volumes, construction methods, and height of ceilings and partitions. Identify materials used and necessary dimensions. See paragraph on Drawing Scales for Building Section scale requirements.

1.5.1.6 Wall Sections

Drawings shall include all wall sections and stair section conditions including corridors, showing vertical control elevations and dimensions, with all materials labeled. The sections should normally be cut through doors, windows, and other critical wall section locations. Wall sections shall not be broken. Additional details shall be included when necessary to illustrate important or unusual features. All horizontal dimensions shall occur on the plans and vertical dimensions on the sections and elevations. See paragraph on Drawing Scales for Wall Section scale requirements.

1.5.1.7 Room Finish Schedules

Room finish schedule shall be complete in accordance with Corps of Engineers (COE) standard format.

1.5.1.8 Furniture Placement Plan

Provide a layout showing all desk, Lockers, and furniture that will be incorporated into the design of this project.

1.5.1.9 Door, Window, and Louver Schedules

Door schedule shall be complete in accordance with Corps of Engineers (COE) standard format. Schedule shall include door and frame types, except referencing to door details and hardware sets. Window and louver schedules shall be complete including window and louver types except referencing to details.

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1.5.1.10 Fire Ratings

Wall ratings, and fire hazards shall be clearly indicated as required by Fire Protection criteria. Wall fire ratings shall be graphically shown by a continuous symbol or pocheing within the wall on a Fire Protection /Life Safety Plan. When other functions coexist with the fire protection functions, their integration shall be clearly indicated, with an analysis that describes how both functions will be served. Provide a separate, floor plan which makes an accurate presentation of these various features and functions.

1.5.1.11 Drawing Scales

Architectural work shall be drawn at the scales listed below. Other scales may be used only by written authorization through the Technical Manager, Omaha District. Units of measurements shown on the drawings shall be done in millimeters. All disciplines should use the same scale for plan sheets. The following is a comparison guide to establish equivalent scaling of drawings:

	<u>METRIC</u>
Composite Plans (Note 1)	Varies
Floor Plans	1:100
Reflected Ceiling Plans	1:100
Detail Plans (Note 2)	1:20
Roof Plans	1:100
Exterior Elevations	Same scale as plan
Interior Elevations	1:50 min.
Interior Toilet Elevations	1:20
Building Cross Sections	1:100 or 1:50
Wall Sections	1:10
Stair Sections	1:20
Details (Note 2)	1:5
Wall Types	1:10
Fire Protection Plans (Note 1)	Varies

Notes:

1. Scale of composite plan shall be as required so that the entire facility is drawn on one sheet without break lines.
2. The goal of this requirement is that the details be large enough to show all fixtures, accessories, equipment, materials, manner of construction, clearances required for proper maintenance, and complete dimensions. Toilet rooms and Equipment rooms are examples of the kind of spaces which shall be drawn as a Detail Plan.

1.5.1.12 Legends

Standard architectural material symbols used on the drawings shall be provided as a separate architectural legend drawing located just in front of the architectural drawings in the set. Additional material symbols should be added to the Legend Sheet as needed for the project.

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1.5.1.13 North Arrows

North arrows shall be oriented the same direction on all plan sheets and by all disciplines; including site and civil drawings. Plan north shall be "up" or the left on the drawings. Indicate true north on composite plan drawings. North arrows shall be located approximately at the same location on all sheets.

1.5.1.14 Modular Design

Modular Design practices shall be followed in the design of all masonry buildings or components of buildings. Dimensions shall be figured to whole or half-unit lengths of standard units in order to reduce on-site cutting of masonry.

1.5.1.15 Symbols

The Room and Door Numbering system shall be consistent. The standard symbols for Amendments (a triangular box) or Modifications (a type of circular box, see the chapter on Drafting Criteria) to the contract shall not be used for any other purpose, and care must be taken to avoid using even similar appearing but technically different symbols. Room numbering shall start at the main entrance and proceed clockwise around functional areas.

1.5.1.16 Schedules

Schedules for room finish, doors, windows, louvers, etc., shall be clear and complete. As many columns as necessary should be provided in order to present the essential information. The "Remarks" column should not be used as a substitute for an information column. Normally a single item should be presented on each schedule line. Other scheduling methods as standard with the A-E may be used if approved by written authorization from the Project Architect, Omaha District.

1.5.1.17 Notes

Notes may be placed on drawings to reduce the amount of repetitive drafting, provided that clarity is not lost. General notes should be placed at the right-hand edge of the sheet and, if possible, should be located on the first sheet in the set. Notes that pertain to each drawing however, should be placed on each drawing.

1.5.1.18 Dimensions

Dimensions must be complete, accurate and fully coordinated. Dimensions should be to points easily measurable in the construction, and should be laid out to eliminate refiguring in the field. Dimensions should be tied-in to column lines, etc., to facilitate checking. Plan dimensions for frame construction should be to face of stud (or sheathing) for exterior walls, to one face of stud for interior partitions, and to centerline of openings. For masonry construction, dimensions should be to one or both nominal faces of masonry and to jambs of openings.

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1.5.1.19 Facility Elevation

The level of finished floor shall be indicated as EL.= 0000. Elevations for footings, etc., shall be related to this figure. Sea level elevations shall not be shown on the building drawings.

1.5.1.20 Access to Utilities

All utilities within the building, such as piping, ductwork, electrical work, etc., shall be concealed in finished areas. Provide plumbing chases in toilet areas. The clear space above ceilings and the size of chases must be carefully figured to accommodate piping slopes and connections, ductwork crossovers, and similar situations. Access must be provided to valves, cleanouts, etc. Space provided for utilities systems must be adequate but should not be excessive.

1.5.1.21 Reflected Ceiling Plans

Reflected Ceiling Plans shall be provided for all spaces in the building. Reflected ceiling plans shall show the ceiling tile layout and location of gypsum wallboard and other ceiling types where applicable. All light fixtures, air diffusers, grilles, registers, PA speakers, sprinkler head layout, smoke and heat detectors - if ceiling mounted, and other ceiling mounted items will also be shown on the reflected ceiling plans. The fixtures and other equipment shall be laid out in a regular pattern symmetrical with the ceiling tile grid, or symmetrical with the room centerlines, columns, windows, or other feature that dominates. All ceiling mounted items shown shall be fully coordinated with all other disciplines.

1.5.1.22 Sketches

All sketches presented during the design phase shall be reduced to 8-1/2" by 11" and included in this design analysis to document the design options and decisions evaluated during the design process.

1.5.2 Technical Specifications

1.5.2.1 Use of Technical Guide Specifications

Technical Corps of Engineers Guide Specifications shall be used to achieve the maximum uniformity in contract requirements. The technical guide specifications describe the type and quality of material and installation normally acceptable for Corps construction, and often represent specific agreement between the Corps and the applicable industry. The provisions of the technical guide specifications should not be changed without justification. The 60% submittal shall include a draft edited specifications of all the applicable sections. Items added or deleted in these specification sections shall be evident. Complete descriptions including specific size, gauge, and configuration are included in the technical Guide Specifications for a wide variety of items. The designer must be familiar with the technical Guide Specification requirements in order to provide details fully coordinated with the technical specification descriptions. Terminology used on the drawings shall be the same as used in the Technical Guide Specifications. Where it is desirable to detail a variance with the standard provisions of the Technical Guide Specifications, the specifications must be revised to coordinate with the details. In addition to the guidance in SECTION 01332 on editing technical

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specifications, data and sample submittals for all interior and exterior finishes shall be "GA 1" submittals.

a. New Guide Specifications

New guide specifications shall be limited to those specialty type items not covered in the regular sections of Technical Guide Specifications.

1.5.3 Design Analysis Narrative

The Design Analysis shall be essentially complete with emphasis on the following:

1.5.3.1 Basic Criteria Statement

A statement indicating the basic criteria to be applied to the design including type of construction (noncombustible, etc.), category of construction (permanent, etc.), major fire protection and exit requirements, etc.

1.5.3.2 Description of Materials

A description of materials for all major building components and of all interior and exterior finishes ascertaining their matching of existing. The description of materials must include type of exterior wall construction, room finish schedule, window types, panel materials, etc. The description of materials should follow the continuity of the Military Handbook 1191. The description of finishes may be presented in schedule form.

1.5.3.3 Additional Criteria/Clarification

A list of items on which additional criteria, clarification, or guidance is required.

1.5.3.4 Reason for Selection

The written presentation must include the designer's reasons for selecting specific materials, architectural compatibility, and architectural treatment in all cases in which the reason for selection is not obvious.

1.5.3.5 General Parameters

The design analysis shall follow the format described herein.

- a. The purposes, overall functions, and total capacities of the facility.
- b. The design theme or visual appearance of the exterior and interiors of the building, and how this facility coordinates with the image criteria of the installation on which it will be constructed.
- c. The number of personnel to use facility.
- d. The type of activities and equipment involved.
- e. The anticipated life of the functions to be accommodated.

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- f. The category of construction; permanent.

1.5.3.6 Functional and Technical Requirements

- a. Functional areas, occupant capacities, and allocation, including a functional relationship matrix.
- b. All items of equipment, required.
- c. Occupational safety and health.
- d. Energy conservation energy budget goals.
- e. Sound and vibration control.
- f. Interior service areas.
- g. Physical security; lock and keying, intrusion-detection, alarms, restricted access areas, interior guard support, and ties to local authorities.
- h. Justification for selection of exterior and interior finishes and materials.
- i. Moisture Vapor Control.
- j. Lessons learned incorporated into the design.

1.5.3.7 Design Objectives and Provisions

- a. Adaptation of the building to the size, shape, and orientation of the site.
- b. Building layout to establish convenient circulation flows during normal operation and emergency evacuation activities, for materials, equipment, services, and people.
- c. Grouping spaces into sound-compatible zones and protective construction zones, e.g., for fire and storm.
- d. Space layout compatible with modular (structural and environmental) support systems.
- e. Type of construction materials, architectural systems, and finishes.
- f. Building expandability/changeability.
- g. Physical security.
- h. Energy conservation. (insulation, orientation)
- i. Acoustical design.
- j. Moisture vapor condensation design.

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- k. Composition of masses and spaces architectural compatibility and architectural details to reflect the design theme and desired image, and the scale and nature of the activities involved.
- l. Perception of the building details and volumes. (Specific provisions made, e.g., an identifiable sequence of viewing positions for experiencing the interior and exterior architectural design.)
- m. Enhancement of materials and systems maintenance and operation.
- n. Economy of building construction, operation, and maintenance: life-cycle cost effectiveness.

1.5.3.8 Coordination with Installation or Outside Agencies

- a. Physical security support.
- b. Occupational safety and health, as required.
- c. Government furnished equipment.
- d. Operations and maintenance support.

1.5.3.9 Checklists

Fire Protection Code Analysis shall be included in the Design Analysis. See Attachments Code Analysis and ADA Architectural Design Checklist at the end of this section.

1.5.4 Design Analysis Calculations

- a. Gross building areas.
- b. U-values for each wall, window, door, or roof type studied or selected.
- c. Acoustics.
- d. Rainfall intensity relative to roof area and roof drain size and number calculations.

1.6 INTERIOR DESIGN

1.6.1 Definitions

(a) Military interior is classified into two categories: *Structural Interior Design*, (SID), and *Comprehensive Interior Design*, (CID).

(b) Structural Interior Design includes but is not limited to the design for all the building related interior finishes such as walls, ceiling, floor coverings, etc., and may also include prewired workstations. All other furniture shown on SID related drawings not in contract.

(c) Comprehensive Interior Design is the design for all the interior furnishings and the finishes related to them.

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(d) Completion of an SID involves the selection and sampling of all applied finishes for the building's interior features, and may include drawings and specifications for prewired workstations. The SID package will include interior floor plans and interior color samples. If necessary, it will also include interior elevations showing finish placement and all information for prewired workstations. The products and materials specified are purchased and installed by the General Contractor.

(e) Completion of a CID involves the selection and sampling of the furnishings components of the interior environment in addition to the structural interior design. This may include systems furniture, freestanding furniture, artwork, and accessories. The CID package will include furniture placement plans, information on all freestanding furnishings and accessories, furniture cost estimates, and order data sheets. The products and materials listed are purchased by the Government.

(f) The interior designer should identify items in the SID or CID that require attachment to the building by cutting or fitting, and should prepare construction drawings and specifications to cover these operations. These items must be properly coordinated with other work on the project.

(g) When indicating manufacturers' product styles and colors for a project, use a Color Guide Specification that covers the color of the exterior and interior materials and products that will be exposed to view in the finished construction, and that will be sampled in the SID and CID binders. Specific locations where materials are required are to be shown on the drawings via a standard material, finish, and color schedule. Key the color codes used on the drawings with the products indicated in the Color Guide Specification. The Color Guide Specification should include a non-proprietary disclaimer that reads: "Trade names indicated are non-proprietary and are intended only to indicate color, texture, and pattern." See Appendix D for an example.

(h) Federal Standard Colors are not required on interior design projects, but may be used if desired.

(i) Design Requirements

The Contractor shall use the Guide Specification SECTION 09915 COLOR SCHEDULE and the Contract Drawings for the development of the SID exterior and interior finishes, materials, and colors. The SID shall run concurrent with the architectural submittal. The Contractor shall update the color boards and the Guide Specification to reflect any of the Government comments or discontinued manufacturer colors indicated. The final SID finishes accepted at the 95% design phase shall be the SID finishes installed during the construction phase of the project.

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1.6.2 Presentation Format

(a) SID and CID information and samples are to be submitted in 216 mm by 279 mm format in separate 76-mm ring binders with pockets on the inside of the covers. When there are numerous pages with thick samples, more than one binder should be used. Large D-ring binders are preferred to O-ring binders. Fold out items should have a maximum spread of 648 mm.

(b) Each binder should be labeled on the outside spine and front cover with the following information:

- Phase %
- SID or CID
- Project Title and Number
- Location
- Date
- A-E firm
- Volume Number (e.g., Vol. 1 of 3)

(c) Each sheet within the binder should be labeled with the project title, location, A-E firm name, and sheet number.

(d) Label all finish samples with the material codes used in the Contract Documents.

(e) Color boards should be sturdy enough to support all samples. Use page protectors that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Samples which are difficult to fasten should be labeled with the finish code so they can be identified independently.

(f) Material and finish samples should indicate true pattern, color and texture. Photographs or colored photocopies of materials or fabrics will be disapproved. Carpet samples should be large enough to show a complete pattern or design. If the specified carpet has a large pattern, provide a color photograph showing the overall pattern in addition to the carpet sample. Color photocopies of artwork and plants are acceptable.

1.6.3 Information On Required Drawings

(a) The Composite Floor Plan should show all panels, components and freestanding furniture in relationship to the building and the building systems. This includes information on locations of light switches, fire pull boxes, mechanical devices, and other wall-mounted items. It should be a full size contract drawing showing furnishing item numbers (where applicable). The gross and net square footage of each floor should be noted on the composite floor plans.

1.6.4 Health, Safety, Accessibility, And Environmental Quality

(a) Fire safety is one of the paramount concerns in any design. Designers must comply with all appropriate fire safety codes and provide for safe egress in the event of fire. Also, comply with regulations relating to flammability of interior materials and furnishings.

(b) All designs, including signage, must comply with the Americans with Disabilities Act (ADA) or the Uniform Federal Accessibility Standards (UFAS), whichever is the most stringent.

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(c) Interior design for the military should incorporate the concept of pathway finding. The space plan, the use of color and pattern, and the interior sign package should coalesce to form a well-organized, comprehensible interior environment that guides users and visitors through the building to their destination.

1.6.5 Specific Information For Sid Submittals

(a) This section gives information on assembling an SID package. The Submittal Matrix gives the sequence of assembly and tells what information must be included in each submittal. Note that Interior Design Submittals **must** run concurrent with Architectural Submittals.

Submittal Matrix Summary for SID Packages:

Item	Description	65%	100%	RTA
1	Title Page	X	X	X
2	Table of Contents	X	X	X
3	Narrative of Interior Design Objectives	X	X	X
4	Interior Color Boards (relating to color placement plan)	X	X	X
5	Interior Signage Color Boards	X	X	X
6	Interior Floor Plan (1/4" = 1'- 0" for full size drawings. Use metric scale when required.)	X	X	X
7	Room Finish Schedule / Color Key	X	X	X
8	Signage Plan		X	X
9	Diskette of all Drawings/Plans/Schedules			X

Separate sign drawings should be prepared which indicate plaque size, type, location, and message for all signs. Submit a sample of the sign color in the SID.

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(b) Some of the items which are usually included in, but are not limited to, an SID are listed below:

- Carpet
- Resilient Floor Coverings
- Ceramic Tiles and Stones
- Terrazzo
- Paint
- Wallcoverings
- Wood Stains
- Wall Base
- Ceiling Tiles and Grid
- Plastic Laminates
- Built-in Casework
- Auditorium Seating (Fixed)
- Blinds and other Window Coverings
- Marker Boards/Bulletin Boards
- Prewired Workstations
- Toilet Partitions
- Moveable Room Dividers
- Cubicle Curtains
- Signage
- Stage Curtains
- Trim and Hardware Finishes
- Decorative Light Fixtures

1.6.6 Specific Information For CID Submittals

(a) This section gives information on assembling a CID package. The Submittal Matrix gives the sequence of assembly and tells what information must be included in each submittal if that work is a part of the design contract. Furniture and furniture systems shall be GF/GI.

If the client is purchasing and installing the systems furniture, all systems furniture should be shown in the contract drawings with the note "FOR INFORMATION ONLY".

Submittal Matrix Summary for CID Packages:

Item	Description	65%	100%	RTA
1	Title Page	X	X	X
2	Table of Contents	X	X	X
3	Narrative of Interior Design Objectives	X	X	X
4	Generic Composite Floor Plans with Conventional and Systems Furniture on full size sheet.	X	X	X
5	Manufacturer's Summary Lists		X	X
6	Conventional Furniture Placement Plans.) All areas.	X	X	X
7	Conventional Furniture Illustration Sheets with number codes (all areas)	X	X	X
8	Artwork Illustration Sheets /Artwork Placement Plans	X	X	X
9	Itemized Furniture Cost Estimate	X	X	X
10	Order Data Sheets(all areas)	X	X	X
11	Letter of Justification for Waiver (if required)	X	X	X
12	Diskette of all Drawings/Plans/Schedules			X

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(b) The Manufacturer's Summary List is a list of all the manufacturers whose products are used in the CID package. For each manufacturer, provide the name, address, phone number, fax number and a point of contact.

(c) A Furniture Placement Plan is a plan of one room showing each furniture component in the room. There will be one Furniture Placement Plan for each room in the Composite Floor Plan that contains furniture. Furniture Placement Plans are drawn at $1/4" = 1'-0"$ if possible, or at $1/8" = 1'-0"$ if the room or area illustrated is very large. Each Furniture Placement Plan should include the following information:

- The job name, location, and date
- The footprint of the room
- The furnishings
- The room name and number
- A Furnishing Item Number for each furnishing item
- Quantity of each product specified for the
- CID

(d) Provide one Furniture Illustration Sheet for each item of furniture in the CID. The Furniture Illustration Sheet should include all of the following information:

- The job name, location, and date
- A picture or line drawing of the product specified
- The furnishing item number which keys the product to the Composite Floor Plan and the Furniture Placement Plan
- The options specified, if any
- Specification data on the finishes and fabric
- Samples of the finishes and fabric
- A comprehensive list giving all occurrences of the item, broken down by room. For example:
 - 4 each Room 104 Commander
 - 2 each Room 103 Receptionist

(e) Furniture Illustration Sheets should be arranged in numerical order by furnishing item number. The furnishing item numbers should begin with 001. See Appendix A for an example Furniture Illustration Sheet.

(f) An Artwork Placement Plan shows the spatial relationship between the furniture and the artwork in a room. There will be one Artwork Placement Plan for each room in the Composite Floor Plan that contains artwork. Assign a furnishing item number to each piece of artwork. The Artwork Placement Plan will include the furnishing item number for the artwork and but will show the furniture without item numbers. Artwork Placement Plans are drawn at $1/4" = 1'-0"$ if possible, or at $1/8" = 1'-0"$ if the room or area illustrated is very large. Each Artwork Placement Plan should include the following information:

- The job name, location, and date
- The room name and number
- A plan of the room locating the artwork
- An elevation of each wall containing artwork showing mounting height

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- A Furnishing Item Number for each artwork item
- Quantity of each product specified for the CID

(g) Provide one Artwork Illustration Sheet for each piece of art in the CID. The Artwork Illustration Sheet should include the following information:

- The job name, number, location, and date
- The title of the artwork and the artist's name.
- A picture of the proposed artwork. Color photos are acceptable
- The furnishing item number, which keys the artwork to the Composite Floor Plan and the Artwork Placement Plan
- Name and number of the room where artwork will be displayed
- Frame description and sample of mat colors
- Mounting height and installation instructions
- Specify security mounting if required

(h) The itemized furniture cost estimate lists all furnishings and indicates quantities, unit costs and totals. It is organized according to UNICOR and GSA/FSC Group, Part, and Section of the FSC Schedules. The cost estimate should also include a 10% general contingency and 7% installation listed as separate line items. Estimated freight charges that are not included in furniture cost should also be a separate line item.

(i) The Order Data Sheets provide all information necessary to order the furnishings specified in the CID. Only one item should be listed per data sheet. The sheets should be in numerical order. The Order Data Sheet should include the following information:

- Furnishing item number.
- The job name, location, and date
- FSC Group, part, and section
- GSA Contract Number, Special Item Number (SIN), and contract expiration date
- Maximum Order Limitation
- Source and manufacturer's name (Include ordering address, telephone number and fax number)
- Product name
- Product model number or National Stock Number (NSN)
- Finish name and number
- Fabric name and number
- Dimensions
- Weight
- Description (Include construction information, fabric content, finish application, etc.)
- Justification (Example: "These guest chairs are coordinated to match the task seating at each workstation. The size of the guest chair is critical because of the limited space where they are to be placed. If this company is not selected, coordinate the newly proposed finishes with furniture item numbers #001, 002, 003.")
- Item location by room number
- Quantity per room
- Total quantity

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- Unit price
- Total price
- Estimated freight charges, 7% of item cost (Note whether or not freight charges are included in the price of the CID item.)
- Special instructions (if any)

(j) Request for UNICOR Waiver: Address letter to the applicable UNICOR Regional Marketing Center.

Dear Sir:

In accordance with Title 18 U.S.C. 4124(a) and Federal Acquisition Regulation subpart 8.6, this installation is requesting a waiver to purchase systems furniture from _____ or any other furniture company that can meet our minimum requirements. Our minimum requirements with respect to product specifications, delivery and installation, and budget restrictions must be met. An analysis of three (3) manufacturers is required with justification for manufacturer selected.

{Provide a comparison of price and pertinent technical differences between items requested and items being compared. Include statements justifying inadequacies of items being compared in performing required functions, and the advantages (such as technical, economic or other) of the item requested.}

Enclosure (1) details our minimum product requirements. Enclosure (2) states our minimum requirements for delivery and installation. Enclosure (3) includes information on the required typical workstations and a listing of the products and approximate cost for our minimum requirements.

Please evaluate this request for the waiver and provide an answer prior to _____ to ensure that contracts are awarded in a timely manner. Your cooperation in this matter is most appreciated.

Sincerely, etc.

(k) General Design/Cost Information for CIDs: Furniture may be obtained from three categories of sources: UNICOR, GSA Federal Supply Schedule, and open market. Every effort should be made to use UNICOR or GSA Stock/Federal Supply Schedule items for CID projects. There may be occasions when there is no current FSS/GSA or UNICOR resource for a furnishing requirement, or when items available on FSS/GSA contract or from UNICOR do not meet the functional requirements of the project. If the latter occurs, the Base Contracting Officer must submit a Request for Waiver to UNICOR. (See the following example.) The A-E shall assist in the waiver process by providing the information within the brackets of the sample letter below. GSA sources are not mandatory for DoD projects, but all procurement procedures must be followed as stated in the FAR. Open market line items over \$2,500 will require a justification letter. Open market line items over \$25,000 will have to be solicited by bid, and solicitation documents including detailed specifications will be required. Line items under GSA contract that exceed the Maximum Order Limitation (MOL) will also require a formal solicitation for bid.

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(1) The furnishings which are usually included in, but not limited to, a CID are listed below.

- ADP tables/printer stands/support furnishings
- Artwork
- Audio-Visual support furnishings
- Beds, wall units, night stands, chests, mirrors, refrigerators
- Bedspreads, bedding, mattresses, box springs, bed frames or boxes
- Bookcases
- Bulletin boards, projection screens/marker boards (if NOT attached to structure)
- Carts
- Chairs - all seating types except those attached to structure
- Desks - unless included in furniture system
- Drafting tables
- Draperies
- Files
- Freestanding partitions
- Lamps
- Library furniture
- Lounge furniture - sofas, chairs, occasional tables
- Mobile furnishings - unless included in furniture system
- Modular desk units
- Podiums, lecture stands
- Silk plants
- Storage - all kinds
- Systems furniture workstations (if not in SID)
- Planters, waste and ash receptacles
- Tables - all kinds
- Wardrobes (if not in the construction contract)

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1.6.7 Technical Specifications

Appropriate UFGS guide specifications shall be provided and coordinated with the drawings and design analysis. Specifications shall be edited to identify proposed product and installation requirements. Use SECTION 09915 Color Schedule to specify exterior and interior finish colors. Where materials or installation requirements are not covered in the provided specifications, information shall be prepared to cover these items. In addition to guidance provided in SECTION 01332 on editing technical specifications, data and sample submittals for all interior and exterior finishes (including but not limited to interior design and architectural specifications) shall be "GA 1" submittals.

1.6.8 Submittal Requirements

Refer to Section 01332 Submittals During Design for Interior Design submittal requirements.

1.7 STRUCTURAL

1.7.1 DRAWINGS

Drawings shall include roof framing plans, floor slab plans and foundation plans for buildings. Roof framing plans shall show sufficient details to clearly indicate the type of framing system used, size and spacing of members and their elevations. The location of all columns or pilasters shall be shown, and all building structural members shall be at least outlined. The sizes, locations and elevations of footings shall be shown. Slab plans shall be coordinated with the Architectural sheets and shall indicate the locations of structural walls and masonry partitions, recessed slabs and contraction or construction joints. Concrete slab-on-grade thicknesses and sections shall be shown. Proposed treatment of unique or complex features and details shall be shown on the drawings. Elevation views, sections and details necessary to illustrate the design at a 60% level of completion shall be provided. Drawings shall also include overall building plan dimensions, north arrows, and design notes. Drawings shall be done at a scale appropriate for the design, in no case however, shall plan type drawings be done at a scale smaller than 1:100 or detail type drawings at a scale smaller than 1:20.

1.7.2 SPECIFICATIONS

For this 60% design submittal the Contractor shall provide a listing by title and number of all Technical Specifications proposed for use in the final structural design.

1.7.3 DESIGN ANALYSIS NARRATIVE

Design analysis shall follow the format described in Section 01332 SUBMITTALS DURING DESIGN, Paragraph 3.3, "Design Analyses" and the specific content shall be essentially as outlined below.

1.7.3.1 Design Criteria and References

A list of design criteria references, such as Department of the Air Force Manuals, Army Corps of Engineers Technical Instructions, ACI Standards,

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AISC Specifications, etc., and any other references which were used in the design of the project shall be included in the narrative.

1.7.3.2 Design Loads and Conditions

A list of structural design loads and conditions shall be provided, including:

- Snow load parameters;
- Wind load parameters
- Seismic design parameters;
- Roof live loads;
- Floor live loads, identifying each loading with usage and the room or space where used;
- Foundation design criteria, including the design depth for footings, allowable soil bearing pressure, equivalent fluid densities (or lateral earth pressure coefficients) for the design of earth retaining structures and building components, modulus of subgrade reaction, and any other pertinent data derived from the recommendations of the Final Foundation Analysis report (see Attachment No. 2 included as an appendix to this solicitation), a copy of which shall be included as an Appendix to the design analysis.

1.7.3.3 Structural Materials

A list of structural materials shall be provided, together with the stress grades and/or ASTM designations, as applicable, for structural steel, concrete, and reinforcing steel; the series for steel joists; and identification of the proposed use of each material in the structure.

1.7.3.4 Availability of Precast Concrete Units

Where precast concrete units of particular cross section(s) and concrete strength are a part of the structural design, verification of their availability from precast producers in the project vicinity shall be documented. Acceptable documentation consists of letters from the producers or a written statement by the Contractor identifying the name and address of the precastor(s), description of units and concrete strength(s) available, date when availability was verified, and name of Contractor's staff member who obtained the verification.

1.7.3.5 Description of the Structural System

A concise description of the proposed structural systems selected for the building, together with the reasons for its selection, shall be provided. All principal elements of the structural system selected shall be described. Typically, these shall include:

- Primary supporting members for the roof;
- Masonry walls, type of material, and whether load bearing or non-load bearing, with location of load-bearing walls defined, and measures taken to compensate for expansion/contraction and crack control in masonry walls;
- The proposed system for resisting lateral forces (wind and earthquake) and transferring them to the ground, whether diaphragms, chord bracing, shear walls, braced or moment resisting frame, etc;

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- Foundations, description of special designs to accommodate existing site conditions;
- Concrete slab-on-grade floors, description of floor surface finish treatment, accommodation of live loads, and the use, location and types of crack control joints;
- The proposed treatment of any unusual structural loadings, features or unique solutions to structural problems;
- Identification of any major vibrating elements and measures taken to isolate them.

1.7.4 DESIGN ANALYSIS CALCULATIONS

The extent of the structural calculations shall be indicative of a design which has reached a 60% level of completion. Computations shall include the determination of snow, wind, seismic, dead and live loads. Computations shall show sizing and spacing of structural members for roof framing, sidewalls and foundation sizes, as appropriate to the systems to be used for these elements.

1.8 MECHANICAL

Compliance with the design requirements for the building mechanical systems will be determined by a review of the submitted 60 percent drawings, design analysis, and specifications. Any conflicts in the design requirements or lack of thorough understanding of the nature and scope of work shall be identified and resolved prior to submittal of the 60 percent design.

1.8.1 DESIGN DRAWINGS

The 60 percent design drawings shall be fully coordinated with the design analysis. Provide sufficient plans, piping diagrams, sections, air and water flow diagrams, details, schedules, and control diagrams/sequences of operation etc. shall be provided as necessary to define the required design intent. Floor plans shall use the architectural floor plans as a basis, with the building outline half-toned. Unless otherwise indicated, all floor plans shall be drawn at 1:100 scale and show all room names and numbers. Coordinate with architectural design for provisions of access panels for all concealed valves, traps, fire dampers and air vents etc. Coordinate with architectural design so that louvers shown on architectural drawings match damper sizes for the respective openings as shown on Mechanical drawings. An exception to this are administrative areas being air-conditioned shall be 1:50 scale and mechanical room plans shall be 1:20 scale. Sheet reference number sequencing shall be in accordance with the Omaha District CADD Standards Manual. Submittal drawings shall include, but not limited to, the following:

1.8.1.1 Mechanical Index Sheet

An index sheet identifying all mechanical drawings shall be provided, including those drawings anticipated to be provided in the 100 percent design submittal. Index shall include drawing design file numbers, drawing numbers, sheet numbers, and drawing descriptions.

1.8.1.2 Mechanical Abbreviation, Legend, and General Notes Sheet

This sheet shall include all mechanical abbreviations and symbols that will be used on the drawings. Symbols shall be grouped into sections; as a

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minimum, provide sections for Plumbing, Heating, Miscellaneous Piping, Valves and Fittings, and ventilation.

1.8.1.3 Exterior Utility Drawings

The following exterior utility drawings shall be provided:

a. Utility Plan:

All existing and new mechanical utilities shall be indicated on the Site Composite Utilities Plan located in the civil section of the drawing package. The location of existing exterior utilities shall be thoroughly checked and indicated on plans and profiles, thus preventing interference with new services. The utility drawing shall indicate all new utilities, including tie-in points, and existing utilities which are to be abandoned.

1.8.1.4 Plumbing Drawings

The following plumbing drawings shall be provided:

a. Plumbing Plans:

Plumbing plans showing the design and tentative layout of the domestic hot and cold water distribution systems; make-up water piping; soil, waste and vent piping; and storm water drainage system shall be provided. Plans shall show all anticipated routing of piping systems from the connections within the structure to a point 1.5 meters outside the structure. The grade of all drain lines shall be calculated and invert elevations established. All electrical panels/equipment and pertinent HVAC equipment (expansion tanks, boilers, AHU's, pumps, lawn sprinkler system, etc.) shall be outlined in half-tone on the plumbing plans. Plans may combine building areas and be drawn at 1:100 scale as long as legibility is not compromised. Plumbing fixtures and drains shown on the drawings shall be designated by the same identification system used in the Technical Specification and Plumbing Fixture Schedule.

b. Enlarged Mechanical Room Plumbing Plan:

An enlarged mechanical room plumbing plan drawn at a minimum 1:50 scale shall be provided. Plan shall show layout of all plumbing equipment and piping within the rooms. In addition to all the plumbing systems required, the plan shall show half-toned outlines of all HVAC equipment located in the room, gas service, lawn sprinkler apparatus, the fire protection entrance and risers, and the outline of any electrical panels or equipment located in the room.

c. Plumbing Detail and Schedule Sheet:

The following details shall be provided: water heaters, roof drain, floor drain, cleanouts, and water service entrance. Provide plumbing fixture schedules and a contractor generated water heater schedule.

d. Enlarged Toilet Room Plans:

Enlarged toilet room plans showing all fixtures, water, waste, and vent piping shall be provided for each toilet area. Enlarged plans shall be drawn at a minimum 1:50 scale.

1.8.1.5 Mechanical HVAC Drawings

Show on mechanical HVAC drawings, all items of mechanical equipment, including boiler room equipment, HVAC equipment layout, air handling units, air distribution and exhaust systems, etc., to determine proper space allocation within the intent of the architectural layout requirements. Plans, elevations, and sections shall be developed sufficiently to insure that major equipment items, piping, and ductwork cause no interference with structural members, electrical equipment, etc. The following HVAC drawings shall be provided:

a. Mechanical HVAC Plans:

Mechanical HVAC plans showing the design and tentative layout of the hot water piping distribution system and equipment, the air supply and distribution systems, and the ventilation and exhaust systems shall be provided. Air supply and distribution systems shall show all ductwork, including supply and return ductwork to terminal units, terminal units, ductwork to diffusers, and all diffusers. For the 60 percent submittal, all ductwork may be shown as single-lined. The final design submittal shall show all ductwork as double-lined. All electrical panels/equipment and pertinent plumbing equipment shall be outlined in half-tone on the HVAC plans.

b. Enlarged Mechanical Room HVAC Plans:

Enlarged mechanical room HVAC plans showing all mechanical systems and drawn at a minimum 1:20 scale shall be provided. Plans shall show layout of all equipment, AHU'S piping, and ducts located within the rooms. Equipment shall include (but not limited to) air handling units with associated outside air intakes, relief air, and supply/return ducts; exhaust/supply fans, mechanical room ventilation intake/relief openings, gas service entrance, combustion air opening, unit heaters, HW pumps, CW pumps, boilers, chillers, air separators, expansion tanks, water treatment, variable frequency drives and temperature control panels. Openings for relief air and outside air shall be coordinated with size of architectural louver. Plans shall show dedicated access space for items requiring maintenance. In addition to all the mechanical HVAC systems required, the plan shall show half-toned outlines of all major plumbing equipment, the water service entrance, fire protection entrance and riser, lawn sprinkler apparatus, and any electrical equipment or panels located in the room.

c. Mechanical Room Sections:

For each air handling unit within the mechanical room, a mechanical room section view shall be provided showing, but not limited to, all AHU components, ductwork connections/routing, and relationship to adjacent structural features.

d. Hot Water and Chilled Water System Flow Diagram:

Provide flow diagram showing the facility piping system including the pumps and connected hot water and chilled water equipment. Each pump and equipment item shall show associated flow rate. All thermometers, pressure gauges, isolation and control valves, bypass piping, freeze protection piping, etc. shall be shown on the flow diagram. Coordinate heating and

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chilled water flow with control valves so that adequate three-way valves are provided to insure minimum flow rates through boiler and chiller at low building load demands.

e. Mechanical Detail Sheets:

Installation details showing all specification requirements such as isolation and balancing valves, thermometers, pressure gauges, equipment pads, strainers, vents, hangers, vibration isolation, etc. shall be provided for each item of mechanical equipment. As a minimum, the following mechanical details shall be provided to the extent they are included in the design:

Computer Room A/C Unit	Pipe and Duct, Wall, Roof and Floor Penetrations
Hot Water Boilers and Piping Diagrams and Gas Train	Pipe and Duct Hangers
Chilled water piping Diagrams	Vibration Isolators
Chilled water pumps	Storage Tanks
Hot Water Pumps	Duct Connections
Hot water coil piping	Dampers
Chilled water coil piping	Air Flow Measuring Station
Expansion Tanks	Reduced Pressure Backflow Preventer, including Pipe to Drain
Horizontal Unit Heaters	Cooling Coil Condensate Trap at Air Handler
Chemical Shot Feeders	Access Doors
Gas Service Entrances	Heat Exchanger
Air Handling Units	Pipe Guides
Wall Propeller Supply/Exhaust Fans	Humidifier
In-line Supply/Exhaust Fans	Terminal Units with Reheat Coil
Relief Hoods	Air Distribution End Devices
Relief Vents	Air Vent
Exhaust Hoods	Fan Coil Unit
Roof-Mounted Exhaust Fans	
Chiller Piping Connection	

All equipment items shall show and note installation and distribution system connections.

f. Mechanical Schedule Sheets:

Schedules, with preliminary capacities, shall be provided for each item of mechanical equipment. Furnished typical equipment schedules shall be used whenever possible and shall be revised and completed as necessary to suit the project requirements. In addition to the furnished schedules, damper and control valve schedules shall also be provided.

1.8.1.6 HVAC Control Drawings

Simplified, one-line type control schematics showing all control system interface points and detailed sequence of operation shall be provided for all mechanical equipment and systems. Sequence of operation for each item of equipment and system shall be sub-sectioned into paragraphs describing discreet operational requirements. See section 1006 for specific DDC control system requirements. The following drawings shall be provided:

HVAC Controls Legend:

This sheet shall include all control abbreviations and symbols that will be used on the drawings. Furnished Controls Legend sheet shall be used as a basis for all abbreviations and symbols used on the Final Control Drawings.

a. Misc Systems:

These sheets shall include all miscellaneous equipment items such as supply/exhaust fans, unit heaters, controls, etc. that are not interlocked to the main HW, CW or air handling unit systems. Provide control schematic and sequence of control for each item of equipment on the same sheet.

b. Hot Water System

Provide a boiler and pumping system control schematic and sequence of operation.

c. Air Conditioning System:

Provide a chiller and chilled water pumping system control schematic and sequence of operation. Include all items of equipment that are interlocked to each system.

d. Air Handling Systems:

For each air handling system, including outside air makeup system, provide a control schematic and a sequence of operation. Include all items of equipment that are interlocked to each system.

e. Control Points Lists:

Provide Local Control Panel control points lists for all items of equipment and systems, identifying all anticipated temperature control system input/output points. The format for defining the input/output points shall be as identified on the furnished Example Control Point List sheets.

1.8.2 Technical Specifications

Government provided (UFGS) technical guide specifications (available to the Design-Build Contractor at the Techinfo website: www.hnd.usace.army.mil) shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for the facility. The provided specifications define the minimum requirements for items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals and testing that shall be provided for the facility. Where items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals or testing requirements are not covered in the provided specifications, special Sections within each guide specification(s) shall be prepared to cover those subjects. Specific items of equipment identified in the provided specifications but not required for the facility shall be edited out. Government conformance review is required for any specification addition or deletion.

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The following UFGS guide specifications shall be edited and coordinated with the drawings and design analysis to identify the proposed product and installation requirements for the facility:

15070	Seismic Protection for Mechanical Equipment
15080	Thermal Insulation for Mechanical Systems
15405	Plumbing, Hospital
15190	Gas Piping Systems
15569	Water and Steam Heating; Oil, Gas or Both; up to 20 MBTUH
15650	Central Refrigerated Air-Conditioning System
15895	Air-Supply, Distribution, Ventilation, and Exhaust System
15951	Direct Digital Control for HVAC
15990	Testing, Adjusting and Balancing of HVAC Systems
15995	Commissioning For HVAC Systems

Proposed HVAC and Temperature Control System Performance Test and Functional Performance Checklists shall be included in the appropriate specifications.

1.8.3 Design Analysis Narrative

The narrative portion of the design analysis shall contain a narrative description and analysis for each of the mechanical portions of the design. The basis and reasons for specific engineering decisions, special features, unusual requirements, etc., shall be explained or summarized as applicable. If it is necessary to deviate from criteria or standard practice, reasons shall also be included. Design statements shall be provided in sufficient detail to enable the reviewer to get a clear picture and understanding of all included work so that approval will be granted. Narrative shall be complete relative to scope and intended design approaches. The total scope projected to final design shall be outlined in a form that will be conveniently adapted, expanded, and detailed at the final design stage. If alternatives were to be evaluated and selected by the designer, findings (pros and cons) and conclusions shall be included. The design analysis shall carry a complete narrative for every item and system covered in the design, and shall include, but not be limited to, the following:

HVAC and temperature control system performance test and functional performance checklists shall be included in the appropriate specifications.

1.8.3.1 Index

Provide a design analysis index identifying all main and sub-paragraph headings.

1.8.3.2 Project Summary

Provide a brief description of the mechanical design objectives.

1.8.3.3 Applicable Criteria

A list of all applicable criteria used for basis of design.

1.8.3.4 Technical Specifications

Provide Edited Technical Corps of Engineers Guide Specifications that will be used for the project.

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1.8.3.5 Design Conditions

A list of Mechanical HVAC design conditions including elevation, latitude, heating/cooling degree days, winter and summer outside design temperatures, inside design temperatures for all spaces, ventilation rates, etc. shall be provided.

1.8.3.6 System Descriptions

Provide a complete description of all building systems; include the designer's reasons for selecting specific materials, systems, etc. in which the reason for selection is not obvious. System descriptions shall be include, but not limited to, the following:

- Plumbing Systems
- Interior Gas Piping Systems
- Hot Water Heating Systems
- Air Supply and Distribution Systems
- Ventilation and Exhaust Systems
- Temperature Control Systems
- Chilled Water Systems

1.8.4 Design Analysis Calculations

The Design Analysis calculations shall provide an estimate of the heating, cooling, and ventilation loads to determine a preliminary selection of the type and size of mechanical equipment to be used. Design calculations shall be provided in sufficient detail to enable the reviewer to get a clear understanding of all work to allow approval. Backup data shall be furnished to support basic design decisions related to sizing of major equipment and materials, performance of specific systems or equipment. Manufacturer's catalog data sheets shall be provided for each item of equipment selected. Calculations may be performed by manual or computerized procedures. Use of standardized charts, curves, tables, and graphs will generally be acceptable for portions of required calculations lieu of specific calculation procedures. Such data must be from a recognized source which is identified in the design analysis and shall be included with the calculations. Design calculations and computations shall be provided for all systems and shall include, but not limited to, the following:

1.8.4.1 Index

Provide a design analysis index identifying all calculation items.

1.8.4.2 Design Conditions

A list of Mechanical HVAC design conditions including elevation, latitude, heating/cooling degree days, winter and summer outside design temperatures, inside design temperatures for all spaces, ventilation rates, etc. shall be provided.

1.8.4.3 Zone Air-Conditioning Loads

Preliminary cooling calculations shall be prepared using the Cooling Load Temperature Differential/Cooling Load Factors (CLTD/CLF) Method as described in the ASHRAE Handbook Fundamentals.

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1.8.4.4 Block Air-Conditioning Loads

Preliminary block cooling load calculations, encompassing the air-conditioned areas, shall be prepared using the CLTD/DLF Method

1.8.4.5 Chilled Water Pump Selections

Include pump flow calculations and catalog selection data indicating dimensions, connection sizes, rpm, horsepower, and efficiency.

1.8.4.6 Heating Loads

For each area or room requiring heat; provide calculations.

1.8.4.7 Heating Load Summary

A tabular summary of all heating load calculations for each area or room, including combustion air heating, shall be provided.

1.8.4.8 Boiler Selection

Include boiler capacity adjustments for altitude, inefficiency, and net rating. Provide catalog data indicating input capacity, net output capacity, dimensions, and water and flue size connections.

1.8.4.9 Hot Water Pump Selection

Include pump flow calculations and catalog selection data indicating dimensions, connection sizes, rpm, horsepower, and efficiency.

1.8.4.10 Combustion-Air Requirements

Include combustion air quantity and free area calculations, louver selection, combustion air heating requirements, and selection of heating equipment.

1.8.4.11 Unit Heater Selections

For each area requiring a unit heater, provide data on capacity, weight, and horsepower.

1.8.4.12 Mechanical Ventilation

For each area or room requiring mechanical ventilation for cooling; provide calculations similar to zone air-conditioning, louver selection, and catalog fan data including condensate/kitchen hoods.

1.8.4.13 Toilets/Janitor Room Ventilation

Provide calculations, catalog fan data, and louver selections, for each toilet area.

1.8.4.14 Air Handling Units

A tabular summary of all airflow calculations for each area or room shall be provided on each air distribution system for fan sizing. summary

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1.8.4.15 Domestic Water Demand

Calculations for determining the size of the domestic cold water supply line to the building shall be provided.

1.8.4.16 Domestic Hot Water Demand

The design guidance provided for service water heating in ASHRAE Handbook HVAC Systems and Applications shall be followed to determine the domestic hot water demand for the facility. Provide catalog data for the domestic water heaters.

1.8.4.17 Electrical Load Summary

A summary of all mechanical equipment and the associated electrical load requirements shall be provided.

Additional calculations to be provided are:

- Pipe sizing calculations for the CW and HW, and gas piping systems
- CW and HW pump head
- CW and HW expansion tank sizing
- External static pressure calculations for all fans
- Control valve Cv calculations
- Acoustical calculations to determine attenuation requirements for HVAC system

1.8.5 Energy Conservation

Mechanical designs shall be economical, maintainable and energy conservative with full consideration given to the functional requirements and planned life of the facility. Emphasis shall be given to heat reclamation, daylighting, vestibules, variable frequency drives, outside air usage and other energy conservation measures for mechanical systems. Each major item of proposed mechanical equipment shall have a net efficiency rating that is equal to or exceeds the net efficiency ratings of similar or equal equipment of the four manufacturers each having one of the four highest ratings.

1.8.6 Air Pollution Control

Air pollution control shall be incorporated in all designs. The Architect-Engineer shall investigate the latest Using Service, Local, State, and Federal regulations and standards, analyze and report on requirements in the design analysis, and include in the design as applicable. The most stringent of all regulations and standards shall be implemented into the design. If in doubt as to requirements, contact this office for assistance. See also, paragraph ENVIRONMENTAL PROTECTION COMPLIANCE.

1.9 ELECTRICAL

1.9.1 Drawings

Drawing scale shall match architectural drawing requirements. Drawings shall show the following:

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1.9.1.1 Lighting Layout and List of Fixtures

Complete lighting layout of all areas shall be provided. The lighting layout shall consist of lights, switches and other lighting controls (as needed) in all rooms. The type of fixture shall be indicated on the drawing. Complete list of fixtures proposed with type of lamp and wattage.

1.9.1.2 Receptacle Layout

Receptacle layout shall include convenience and special purpose outlets; locations of hardwire connections to medical utilization equipment for all areas.

1.9.1.3 Power Equipment and Layout

Power equipment and layout such as switchgear, panelboards, large motor driven items, etc.

1.9.1.4 Power One Line Diagram

Power one line diagram shall be shown to indicate arrangement of the system.

1.9.1.5 Fire Detection

Fire Detection drawings shall be provided and inserted in the Fire Protection/Fire Suppression F-Series of drawings.

1.9.1.6 Miscellaneous Details of Special Equipment

Miscellaneous details of special equipment to indicate understanding of Section 01007, ELECTRICAL REQUIREMENTS.

1.9.2 Specifications

Submit prescriptive specification sections to specify the quality, characteristics, installation procedures and testing requirements for all items of the proposed electrical design.

Specifications shall be provided (to approximately 60 percent completion). See Section 01332 SUBMITTALS DURING DESIGN, paragraph 3.2, SPECIFICATIONS for additional requirements.

1.9.3 Design Analysis Narrative

The design analysis shall contain a description and analysis of the electrical portions of the design. Special features, unusual requirements, etc., should be noted. Narrative must address all technical requirements identified in Section 01007 ELECTRICAL REQUIREMENTS.

1.9.4 Design Analysis Calculations

Backup data shall be furnished to support basic design decisions related to sizing of major equipment and materials. As a minimum the following shall be submitted.

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1.9.4.1 Service

Sizing of building services EMD (Estimated Maximum Demand) for all the building loads.

1.9.4.2 Transformers

Sizing of general purpose dry type transformers.

1.9.4.3 Feeders

Sizing of main feeders.

1.9.4.4 Panelboards

Sizing of panelboards and distribution equipment.

1.9.4.5 Illumination Calculations

Data should identify target and calculated illumination levels for all typical rooms. Calculations should be adjusted to compensate for special applications such as irregularly shaped rooms, open sides, ceiling obstructions (beams, ductwork), corridors, etc. If the lumen method is used for corridor calculations, the calculations should be performed using a module in which the length doesn't exceed 3 times the width (2:1 ratio preferred).

1.9.4.6 Short Circuit Evaluation

The maximum possible fault current at the building service should be calculated.

1.10 COMMUNICATIONS DESIGN

- a. Confirm compliance with all criteria contained in the RFP.
- b. Continue to expand the DA to include the function and operation of each system to include interfaces to other systems and existing systems.
- c. Drawings:
 - 1) Communications Systems Legend.
 - 2) Communications floor plan drawings (scale 1/4" = 1'-0") to indicate specific types and locations of all communication outlets including tie-in points for telephone and program distribution systems. Drawings to indicate room numbers, room titles and all furniture/-equipment layouts without furniture/equipment identification numbers.
 - 3) Vertical risers showing sizes and quantities of conduits and cables.
 - 4) Room layouts (scale 1:50) for all communications, operations, and equipment rooms as listed in Chapter 12, AEI MDS, to include locations of equipment racks, terminal cabinets, power junction boxes, control units, standby DC power supplies, annunciators, CPU's,

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terminals, printers, entering and exiting conduits and cable trays, and signal ground facilities.

5) Complete communication system risers on the telephone system, voice and data cabling system, loudspeaker paging and program distribution system, intrusion detection system, nurse call and the TV distribution systems. These drawings shall indicate all components to be installed and their locations.

6) Voice, data or video communications systems which are to be installed by elements other than the Contractor, e.g., selected CCTV systems, automatic data processing, or other special communication systems, conduit-only riser diagrams will be provided.

7) Functional block diagrams for each communications system included in the technical Design Instructions.

8) Provide detail drawings of every type of communications systems outlets.

9) Provide details of all outside plant duct work to include depth, number and size of ducts, cable population of ducts and any innerduct provided.

d. Prepare preliminary design calculations for the Public Address (PA) and program distribution system, to include sound level calculations and amplifier sizing computations.

e. Prepare expanded functional block diagrams of all communications systems and describe in detail the functional relationships and systems operation in the design analysis.

f. The exact locations of the communications equipment (i.e., wall telephones) installed in rooms with equipment and casework will be shown on the equipment wall elevations drawings prepared under Architectural.

g. Special detail sketches on all communications systems outlets and devices.

h. Expand equipment room layout drawings to include elevations.

i. Sizing calculations for all voice riser cables and for all cable trays. Sizing calculations for public address system speakers, amplifiers, etc.

j. Update TSRS.

k. Specifications: Provide draft specifications for each communications systems to be provided as part of the construction project.

1.10.1 Security Engineering

Included in Electrical and Communication Design.

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1.11 FIRE PROTECTION

1.11.1 Drawings

Features of Fire Protection, their ratings, and the hazards requiring them, shall be clearly indicated. Sprinkler and fire alarm/detection areas shall also be clearly indicated. Fire detection and sprinkler systems shall be laid out and detailed sufficiently to indicate the designers understanding of the Section 01008 FIRE PROTECTION REQUIREMENTS. When other functions co-exist with the fire protection functions, their integration shall be clearly indicated, with an analysis that describes how both functions will be served. Provide a separate, composite type floor plan which makes an accurate presentation of these various features and functions. As part of the submittal, provide a set of plans that shows emergency egress for the facility.

1.11.2 Design Analysis

The design analysis shall include a separate fire protection report containing, but not limited to, review statements and/or comments on the following items, where applicable.

- a. Location and rating of fire walls and fire partitions.
- b. Column, floor, and roof protection.
- c. Path of travel for emergency egress and operation of panic exits.
- d. Access to building for fire fighting.
- e. Design and placement of fire and smoke stop doors.
- f. Labeled windows, where required.
- g. Venting of smoke.
- h. Placement of hand fire extinguisher cabinets.
- i. Type and adequacy of sprinkler system.
- j. Building exterior fire protection facilities and building clearances.
- k. Type of occupancy.
- l. Type of Construction.
- m. Height and area limitation.
- n. Flame-spread and smoke-developed ratings.
- o. Water supplies for fire protection.

1.11.3 Technical Guide Specifications

None of the UFGS guide specifications are required to be submitted at this design stage. However; any Contractor generated specifications required to

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MEDICAL/DENTAL CLINIC
SCHRIEVER AFB, CO

meet the project specifics, or individual specification items added to the provided guide specifications shall be submitted for review. Note that guide specifications 13930, WET PIPE SPRINKLER SYSTEMS, FIRE PROTECTION are required for this contract. As such may be edited only for those portions that do not apply to this project. Note that this applies only to equipment items. Testing, qualifications, submittal requirements, etc., may not be modified or deleted. For the equipment items that do apply, no changes may be made.

1.12 ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS

Specification Section 01410, ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS furnished with Division 1 of this RFP, contains requirements presently known to be required for environmental protection, compliance, and permits. It is the Contractor's responsibility to provide any additional requirements to ensure that the project is in full environmental compliance with Federal, State, Regional and local laws and regulations. All new environmental requirements shall be submitted with the 60% Design Review Submittal.

1.12.1 Design Analysis Chapter

The Contractor shall prepare a chapter in the Design Analysis entitled: "ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS". This chapter shall include a summary of environmental coordination, compliance, approvals, permits, and etc. required for the project. The Contractor shall include documentation of the coordinations, discussions, phone conversation records, and/or letters required to assure that the project is in full compliance with all Federal, State, Regional, and local environmental laws and regulations. A list of environmental permits, approvals, notifications, etc. that is required for the project shall be included.

1.12.2 Draft Environmental Protection Plan

The Contractor shall prepare and submit a Draft Environmental Protection Plan in accordance with the requirements of Section 01410 ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS. If additional environmental compliance plans are identified, during the design, the Contractor shall submit the additional environmental plans and/or attachments.

1.12.3 Submittal of Environmental Permits, Notices, Reviews and/or Permit Applications and Associated Documents

As an Appendix to the Draft Environmental Protection Plan, the Contractor shall submit copies of all environmental permits, notices, reviews, and/or approvals that are required for the project. Copies of the applications and associated documents required by the environmental permits, notices, reviews, and/or approvals shall be included in the Environmental Protection Plan Appendix.

1.13 SUSTAINABLE DESIGN REQUIREMENTS

Provide a list of planned sustainable design features incorporated into the design of this facility.

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SCHRIEVER AFB, CO
PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

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PART 3 - CODE ANALYSIS
UNIFORM BUILDING CODE (UBC) AND NFPA "LIFE SAFETY CODE" ANALYSIS

LIFE SAFETY AND FIRE PROTECTION IS AN INTEGRAL PART OF EVERY FACILITY DESIGN. RECOGNIZED CODES AND ACCEPTED SAFETY STANDARDS SHALL BE FOLLOWED IN THE DESIGN OF ALL FACILITIES. OF THE VARIOUS CODES AND SAFETY STANDARDS THE NATIONAL FIRE PROTECTION ASSOC. (NFPA) "LIFE SAFETY CODE" SHALL TAKE PRECEDENCE. ALL APPLICABLE REQUIREMENTS OF THE LIFE SAFETY CODE SHALL BE INCORPORATED INTO EACH DESIGN. FOR TYPE OF CONSTRUCTION, FIRE AREA LIMITATIONS, AND ALLOWABLE BUILDING HEIGHTS THE DESIGN SHALL FOLLOW THE UNIFORM BUILDING CODE (UBC).

CHECK LIST

PROJECT NAME _____ DATE _____
LOCATION _____

4. UNIFORM BUILDING CODE ANALYSIS

4.1 OCCUPANCY CLASSIFICATION (See Table 5A):

Area: Classification:
(GROUP: _____): Div. _____
(GROUP: _____): Div. _____
(GROUP: _____): Div. _____

PRINCIPAL OCCUPANCY _____

OTHERS (SPECIFY) _____

4.2 TYPE OF CONSTRUCTION : _____

4.3. OCCUPANCY SEPARATION REQUIRED (SEE TABLE 5-B):

_____	TO	_____	=	_____	HRS
_____	TO	_____	=	_____	HRS
_____	TO	_____	=	_____	HRS
_____	TO	_____	=	_____	HRS
_____	TO	_____	=	_____	HRS

4.4 FIRE RESISTANCE OF EXTERIOR WALLS: (SEE TABLE 5-A)

NORTH _____
SOUTH _____
EAST _____
WEST _____
OTHER _____

PART 3 - CODE ANALYSIS

UNIFORM BUILDING CODE (UBC) AND NFPA "LIFE SAFETY CODE" ANALYSIS

4. UNIFORM BUILDING CODE ANALYSIS

4.5 OPENINGS IN EXTERIOR WALLS: (SEE TABLE 5-A)

NORTH _____
SOUTH _____
EAST _____
WEST _____
OTHER _____

4.6 MAX. ALLOWABLE FLOOR AREA (SEE TABLE 5-C):

ALLOWABLE:

IF SPRINKLERED: _____

ALLOW. AREA INCREASES _____

CALCULATED ACTUAL FLOOR AREA:

Floor	Square Footage
-------	----------------

Totals:

4.7 MAX. ALLOWABLE HEIGHT (SEE TABLE 5-D):

FEET: _____

STORIES: _____

Proposed Height of Building:

Actual No. of Stories:

4.8 COMMENTS:

DESIGNER: _____

PART 3 - CODE ANALYSIS

UNIFORM BUILDING CODE (UBC) AND NFPA "LIFE SAFETY CODE" ANALYSIS

5. NFPA 101 "LIFE SAFETY CODE"

5.1 CLASSIFICATION OF OCCUPANCY: _____

HAZARD OF CONTENTS:

LOW _____

ORDINARY _____

HIGH _____

5.2. FIRE RESISTIVE REQUIREMENTS:

EXTERIOR WALLS: _____ HRS _____

INTERIOR WALLS: _____ HRS _____

STRUCTURAL FRAME: _____ HRS _____

VERTICAL OPENINGS: _____ HRS _____

FLOORS: _____ HRS _____

ROOFS: _____ HRS _____

EXTERIOR DOORS: _____ HRS _____

EXTERIOR WINDOWS: _____ HRS _____

BOILER ROOM ENCLOSURE _____ HRS _____

OTHER (LIST) _____ HRS _____

_____ HRS _____

_____ HRS _____

_____ HRS _____

PART 3 - CODE ANALYSIS

UNIFORM BUILDING CODE (UBC) AND NFPA "LIFE SAFETY CODE" ANALYSIS

5. NFPA 101 "LIFE SAFETY CODE"

5.3 MEANS OF EGRESS:

OCCUPANCY LOAD FACTOR: _____

OCCUPANCY	FACTOR	ACTUAL AREA	ACTUAL LOAD
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

5.4 NUMBER OF EXITS REQUIRED: _____

5.5 MINIMUM WIDTH OF EXITS:

CALCULATED: _____

ACTUAL: _____

5.6 MAXIMUM ALLOWABLE TRAVEL DISTANCE TO EXIT: _____

WITH SPRINKLERS: _____

5.7 EXIT DOORS:

MINIMUM WIDTH ALLOWED: _____

MAXIMUM LEAF WIDTH ALLOWED: _____

WIDTH REQUIRED FOR NO.OF OCCUPANTS: _____

PART 3 - CODE ANALYSIS

UNIFORM BUILDING CODE (UBC) AND NFPA "LIFE SAFETY CODE" ANALYSIS

5. NFPA 101 "LIFE SAFETY CODE"

5.8 EXIT CORRIDORS:

MAX. COMMON PATH OF TRAVEL: _____
MINIMUM ALLOWABLE WIDTH: _____
REQUIRED TO HAVE EXIT AT EACH END OF CORRIDOR? ____

DEAD END CORRIDORS ALLOWED? _____
MAXIMUM LENGTH: _____
WALL FIRE RESISTANCE REQUIRED: _____

DOORS & FRAME FIRE RESISTANCE REQUIRED: _____

5.9 STAIRS:

MINIMUM WIDTH _____ FOR OCCUP. LOAD OF _____
MINIMUM WIDTH _____ FOR OCCUP. LOAD OF _____
MINIMUM WIDTH _____ FOR OCCUP. LOAD OF _____
MINIMUM WIDTH _____ FOR OCCUP. LOAD OF _____

MAX. RISER ALLOWED: _____
MINIMUM TREAD ALLOWED: _____

LANDINGS:

MIN. SIZE: _____
MAX. VERTICAL DIST. BETWEEN LANDINGS: _____

REQUIRED HEIGHT OF RAILINGS: _____

HANDRAILS:

REQUIRED AT EACH SIDE? _____
INTERMEDIATE RAIL REQUIRED? _____
HEIGHT ABOVE NOSING _____
INTERMEDIATE RAIL REQUIRED? _____
MAX. SPACE ALLOWED BETWEEN RAILS: _____

STAIR ENCLOSURE REQUIRED? _____

STAIR TO ROOF REQUIRED? _____

STAIR TO BASEMENT REQUIRED? _____

5.10 HATCHWAY ACCESS TO ROOF REQUIRED? _____

PART 3 - CODE ANALYSIS

UNIFORM BUILDING CODE (UBC) AND NFPA "LIFE SAFETY CODE" ANALYSIS

5. NFPA 101 "LIFE SAFETY CODE"

5.11 LADDER ACCESS TO ROOF REQUIRED? _____

5.12 HORIZONTAL EXIT REQUIREMENTS: _____

5.13 PROTECTION OF OPENINGS NEAR EXTERIOR STAIR EXIT DOORS:

5.14 SMOKEPROOF ENCLOSURE REQUIRED: _____

5.15 RAMPS:

MAX. SLOPE TO USE AS EXIT _____

HANDRAILS REQUIRED? _____

5.16 COMMENTS:

DESIGNER: _____

FOLLOWING IS A LIST OF ADDITIONAL "NFPA" CODES THAT ARE COMMONLY USED.
INDICATE WHICH OF THESE CODES ARE USED AND ADD THOSE REQUIREMENTS TO THIS
ANALYSIS.

MIL HDBK- FIRE PROTECTION FOR FACILITIES, ENGR,
1008C DESIGN AND CONSTRUCTION.
NFPA 10 FIRE EXTINGUISHERS, PORTABLE
NFPA 80 FIRE DOORS AND WINDOWS

ADA ARCHITECTURAL DESIGN CHECKLIST

Project Name:_____

Project Location:_____

Design Phase:_____

ITEM

NO.

INCORP INCORP N/A

LATER

1. Established with the Base/owner of the facility the
for handicap accessibility.

2. Received a waiver for no handicap accessibility requirements
on the facility.

3. Facility is designed utilizing:

New Construction Criteria

Building Alteration Criteria

Historic Building Preservation Criteria:

4. Accessible Route (egress/corridors/halls/aisles).

- Provided minimum fire egress routes.

- Provided minimum site accessible routes.

- Provided proper clearance widths.

- Provided proper floor level changes.

- Provided proper floor materials.

- Provided protection from protruding objects.

ITEM NO.	INCORP LATER	INCORP	N/A
5. Ramps:			
- Maximum slopes less than 1:12	_____	_____	_____
- Maximum run less than 9144mm for 1:12 slopes 12,192mm for 1:16 slopes	_____	_____	_____
- Minimum clear width exceeds 914mm.	_____	_____	_____
- Provided proper edge protection.	_____	_____	_____
- Provided handrails of proper configuration and diameter.	_____	_____	_____
- Provided proper handrail extensions at top and bottom of ramp.	_____	_____	_____
- Provided handrails at proper mounting heights.	_____	_____	_____
- Provided proper landings.	_____	_____	_____
- Provided proper cross slope on ramp surface.	_____	_____	_____
6. Stairs:			
- Protected the space below stairs from access by the blind.	_____	_____	_____
- Provided handrails of proper configuration and diameter.	_____	_____	_____
- Provided proper handrail extensions at top and bottom of stairs.	_____	_____	_____
- Provided handrails at proper mounting heights.	_____	_____	_____
- Provided treads greater than 279mm in width.	_____	_____	_____
- Provided proper nosings.	_____	_____	_____
7. Elevators:			
- Provided buttons and lanterns at the proper mounting height.	_____	_____	_____
- Provided Braille characters.	_____	_____	_____
- Provided proper door widths.	_____	_____	_____
- Provided proper clearance inside elevator car.	_____	_____	_____

ITEM
NO.

INCORP INCORP N/A
LATER

8. Doors And Hardware:

- Provided proper door widths.
- Provided proper clearance on both sides of jambs.
- Entrance vestibules provided with adequate clearances.
- Provided levers on locksets and exit hardware.
- Provided closers with mechanical adjustments.
- Provided accessible thresholds.
- Provided protection plates on doors heavily used by wheel chair bound people.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

9. Toilet Facilities:

- Provided proper floor clearance through out the toilet rooms.
- Provided minimum number of required accessible fixtures.
- Provided accessible toilet stalls.
- Provided stall doors with correct direction of swing.
- Provided accessible water closets.
- Provided grab bars at accessible water closets.
- Provided grab bars with correct configuration and dimension.
- Provided accessible sinks/lavatories.
- Provided accessible urinals.
- Provided accessible water coolers and fountains.
- Provided accessible mirrors.
- Provided accessible toilet accessories at required locations.
- Provided all fixtures and accessories at proper mounting heights and clearances.
- Provided insulated or protected exposed pipes at lavatories.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

10. Shower/Tub Facilities:

- Provided the minimum number of accessible showers/tubs.
- Provided showers/tubs with grab bars.
- Provided showers/tubs with seats as required.
- Provided controls mounted at the proper height and location.
- Provided proper clearances and dimensions in showers/tubs.
- Provided proper floor clearance through out shower/tubs rooms.
- Provided doors with correct direction of swing and clearance.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

ITEM NO.	INCORP LATER	INCORP	N/A
11. Storage:			
- Provided accessible cabinets, shelves, closets, and drawers as required.	_____	_____	_____
- Provided proper clearance, mounting heights, and reach provisions.	_____	_____	_____
12. Telephones and Vending:			
- Provided the minimum number of required accessible public telephones.	_____	_____	_____
- Provided proper floor clearance around telephone.	_____	_____	_____
- Phone and controls mounted at proper heights and within reach.	_____	_____	_____
- Provided vending machines on an accessible route.	_____	_____	_____
- Provided vending machines with accessible clearances and protruding object safe guards.	_____	_____	_____
13. Fixed Or Built-in Seating And Tables:			
- Provided the minimum number of accommodations for accessibility in areas which required fixed furniture.	_____	_____	_____
- Provided proper floor clearance around furniture.	_____	_____	_____
- Provide proper knee space at tables.	_____	_____	_____
- Provided tables and counters with proper top surface heights.	_____	_____	_____
14. Assembly Areas:			
- Provided the minimum number of accessible seating spaces.	_____	_____	_____
- Provided seating which is easily accessible to emergency egress.	_____	_____	_____
- Provided companion seating.	_____	_____	_____
- Integrated and dispersed accessible seating with the rest of the seating.	_____	_____	_____
- Provided accessible dressing rooms.	_____	_____	_____
- Provided level floor surface at accessible seat locations.	_____	_____	_____
- Provided clear ground or floor space at accessible seat locations	_____	_____	_____
- Provided access to all performing areas and associated spaces.	_____	_____	_____

ITEM NO.	INCORP LATER	INCORP	N/A
15. Dining Halls And Cafeterias:			
- Provided the minimum number of accessible dining spaces.	_____	_____	_____
- Provided accessible counters and bars.	_____	_____	_____
- Provided accessible aisles between tables or walls.	_____	_____	_____
- Provided clear floor space at accessible dining locations.	_____	_____	_____
- Provided accessible food service lines meeting minimum clearances and reaches.	_____	_____	_____
- Provided accessible tableware and condiment areas.	_____	_____	_____
- Provided raised speaker platform with protected edges.	_____	_____	_____
16. Medical Care Facilities:			
- At least 10% of the general patient rooms are accessible.	_____	_____	_____
- Provided the number of accessible patient rooms as required for specialized treatment, long term care, or alterations of existing patient rooms.	_____	_____	_____
- Provided at least one accessible entrance with weather protecting canopy or roof overhang.	_____	_____	_____
- Provided minimum clearances within the patient rooms and around the beds.	_____	_____	_____
- Provided accessible patient toilet/bath rooms.	_____	_____	_____
17. Business And Mercantile:			
- Provided at least one accessible sales counter, services counter, teller, information window, etc.	_____	_____	_____
- Security bollards when provided, do not prevent access or egress to people in wheel chairs.	_____	_____	_____

ITEM NO.	INCORP LATER	INCORP	N/A
18. Libraries:			
- Provided access to all reading and stack areas, reference reference rooms, reserve areas, and special facilities or collections.	_____	_____	_____
- Provided at least 5% or a minimum of one of each element or fixed seating, tables, or study carrels as accessible.	_____	_____	_____
- Provided at least one lane of check out areas as accessible.	_____	_____	_____
- Provided adequate clearance and reach distances at card catalogs and magazine displays.	_____	_____	_____
- Provide stacks with minimum clear aisle width.	_____	_____	_____
19. Temporary Lodging:			
- All common and public use areas are accessible.	_____	_____	_____
- Provided accessible units, sleeping rooms, and suites.	_____	_____	_____
- Provided sleeping accommodations for persons with hearing impairments.	_____	_____	_____
- Provided a dispersed class and a range of room options.	_____	_____	_____
- Provided accessible rooms in ADAL projects.	_____	_____	_____
- Provided an accessible route to accessible sleeping rooms.	_____	_____	_____
- Provided accessible clearance widths within sleeping rooms and around beds.	_____	_____	_____
- Provided accessible doors within accessible sleeping rooms.	_____	_____	_____
- Provided accessible fixed or built-in furniture and storage units.	_____	_____	_____
- Provided accessible controls throughout accessible units.	_____	_____	_____
- Where provided as part of an accessible unit each of the following were provided as accessible: living area, dining area, at least one sleeping area, patio/terrace/ balcony, toilet/bath, and carport/garage/parking.	_____	_____	_____
- Where provided as apart of an accessible unit, the kitchen, kitchenettes, wet bars, or similar amenities were also provided with accessible features.	_____	_____	_____
- Provided visual alarms, notification devices, and accessible telephones.	_____	_____	_____
- Provided accessible doors and doorways designed to allow passage into and within all sleeping units or other covered units.	_____	_____	_____

20. Transportation Facilities:

(This section covers Air, Rail, and Bus public transportation facilities. See Section 10 of the ADA Guide for specific requirements for these facilities)

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SECTION 01338

100 PERCENT DESIGN REQUIREMENTS

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100 PERCENT DESIGN REQUIREMENTS

PART 1 100 PERCENT DESIGN SUBMITTALS

For general submittal requirements, see Section 01332 SUBMITTALS DURING DESIGN.

1.1 SITE PLANNING

1.1.1 Drawings

All drawings shall be completely dimensioned in metric units, labeled, and noted. All approved comments from the 60 Percent Design Submittal shall have been incorporated. Cross-reference applicable sheets for items shown. Drawings required:

- a. Location Plan and Vicinity Map
- b. Removal Plan
- c. Site Plan
- d. Site Details
- e. Landscape Plan
- f. Landscape Details

1.1.2 Irrigation Plan

The contractor shall supply an Irrigation System Plan at the same metric scale as the Landscape Plan showing the landscape plan with the proposed turf and plant locations and the completely designed irrigation system with all necessary components and lines with their material types and sizes shown and delineated. All section valves shall be numbered and have the correct gallonage and pressure at which they operate.

1.1.3 Irrigation Details

Details of the irrigation equipment and system including valves, couplers, sprinkler heads, controllers, precipitation rates, pipe material, and total flow and pressure requirements.

1.1.4 Specifications

a. Provide complete edited specifications for all items. Technical specifications shall be complete and fully coordinated with the drawings. All specification indexes shall be completely edited to reflect the paragraphs retained in the body of the specification. All references that have not been used in the body of the specification shall be edited from the technical specification.

b. Specifications shall be coordinated with the plans and include all items including seeding, sodding, trees and shrubs, lawn and plant irrigation, and exterior furnishings. Special sections shall be prepared to

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cover those subjects for which no pattern guide specifications are available. All UFGS guide specifications, to be provided, shall be in edited form showing all text to be deleted and added.

1.1.5 Design Analysis Narrative

Design analysis shall include the following:

1.1.5.1 References

Provide design references used in preparing the site design.

1.1.5.2 Basis For Design

The Design Analysis should give the basis, specific goals, objectives and priorities for site design of the project. Identify, explain and document use of design criteria and how the design meets goals, objectives and priorities. Identify the preferred site development concept. Document pollution prevention measures and other environmental considerations made during the design process.

1.1.5.3 Irrigation System Calculations

A list of applicable criteria and/or design standards shall be provided. This shall include precipitation rates, allowable pipe material and calculations of total flow and pressure requirements. Include a narrative description of the system and list any special requirements and/or systems.

1.2 CIVIL

1.2.1 Drawings

1.2.1.1 Grading and Drainage Plan

A final grading and drainage plan shall be provided at the same scale as the site plan. New and existing grading contours shall be indicated at 0.25 m contour intervals. Indicate the finished floor elevation of all new buildings. Plans shall show the layout of the new and existing storm drainage and roof drainage systems. Uniform grades shall be labeled using slope arrows. Provide spot elevations at building corners, parking area corners, changes in grade, etc. Storm drainage lines and structures shall be labeled. The rim elevation of all manholes, curb inlets, and area inlets shall be indicated.

1.2.1.2 Not Used

1.2.1.3 Grading Sections

Provide as a minimum two grading sections (one east-west and the other north-south through the area of new grading work. These grading sections shall show new vs. existing grades, slopes of finished grades, finish floor elevations in the new building, and identification of main features such as parking areas, building, and walks.

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1.2.1.4 Roof Drain and Culvert Profiles

Provide profiles of all new culverts showing new and existing grades, new and existing utilities, pavement sections in detail, pipe diameters and lengths, pipe slopes, invert elevations, etc. Class and gauge of all culvert pipes shall be provided. This information may also be included in a Storm Drain Schedule drawing. Profiles of roof drain runout lines may or may not be provided, at the Contractor's discretion. However, invert elevations, lengths and pipe diameters of these roof drains shall be called out on the drawings.

1.2.1.5 Drainage Structure Details

Provide typical details of all storm drainage structures.

1.2.1.6 Pavement Details

Provide details of concrete curb and gutter, integral curb, typical pavement sections, typical sidewalk section, pavement utility cut details, and interface detail between new and existing pavement.

1.2.1.7 Erosion Control Details

Provide details of best management practices used to control erosion.

1.2.2 Specifications

Provide complete edited specifications for all items. Technical specifications shall be complete and fully coordinated with the drawings. All specification indexes shall be completely edited to reflect the paragraphs retained in the body of the specification. All references that have not been used in the body of the specification shall be edited from the technical specification.

1.2.3 Design Analysis Narrative

Design analysis shall include the following:

1.2.3.1 References

Provide design references used in preparing the civil design.

1.2.3.2 Grading

A narrative of the grading design and criteria used.

1.2.3.3 Drainage

A narrative of the drainage design and criteria used. Include information on the storm drain pipe materials selected and their ability to withstand earth dead loads and live loads that will be imposed.

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1.2.3.4 Pavements

A narrative of the pavement design and criteria used.

1.2.4 Design Analysis Calculations

1.2.4.1 Storm Drainage System Calculations

Storm Drainage System Calculations shall include the following:

- a. Drainage area map showing boundaries of each drainage area and respective drain inlet or culvert.
- b. Storm run-off calculations for each drainage area.
- c. Tabulation of capacities of new storm drains including: diameter and slope of storm drain pipes, design storm discharge and velocity for each storm drain pipe, maximum discharge capacity of each storm drain pipe, headwater depth of each culvert during design storm discharge.
- d. Hydraulic capacity calculations for each new curb and area inlet.

1.2.4.2 Pavement Design Calculations

Calculations used to obtain the pavement design.

1.2.5 Storm Water Pollution Prevention Plan (SWPPP)

If construction activities results in disturbance of 5 acres of land or more, coverage under the EPA Storm Water General Permit For Construction Activities (Permit No. COR10*##F) is required and the Contractor shall be responsible for complying with the requirements of Specification Section 01565 NPDES PERMIT REQUIREMENTS FOR STORM WATER DISCHARGES FROM CONSTRUCTION SITES. The Contractor and the Omaha District Corps of Engineers shall be co-permittees. If coverage under the NPDES General permit is not required, Specification Section 01565 shall not be applicable.

1.3 GEOTECHNICAL

1.3.1 Drawings

1.3.1.1 Soil Boring Locations

Foundation and pavement design recommendations included in the Final Foundation Analysis Report (Attachment No. 2) are based on soil borings obtained for this project. Drilling, sampling, and testing of subsurface soils were performed by the Omaha District Corps of Engineers. Soil boring locations are shown on the Soil Boring Location Plan included with this RFP package.

1.3.1.2 Soil Boring Log Sheet

Foundation and pavement design recommendations included in the Final Foundation Analysis Report (Attachment No. 2) are based on soil borings as discussed in paragraph 1.3.1.1. Soil boring logs are included with this RFP package.

1.3.2 Design Analysis

The design and construction of building foundation, floor slab and pavement features for the CDC Project shall comply with all requirements in the Final Foundation Analysis Report (Attachment No. 2). As indicated in paragraphs 1.3.1.1 and 1.3.1.2 above, all recommendations are based on site specific soil borings obtained for the CDC Project. A copy of the Final Foundation Report shall be included as an appendix to the Design Analysis.

1.4 WATER SUPPLY AND WASTEWATER

1.4.1 Drawings

Generally, the corrected and approved 60 percent plans may be used as the basis for the final plans. However, all details necessary for complete construction must be included. The 100 percent final design submittal shall include all the information presented in the 60 percent submittal, updated to final design status, corrected to reflect any changes made in response to review comments, and shall include the additional requirements specified hereinafter. Any concerns in developing the final design documents shall be resolved prior to starting the final design stage.

1.4.1.1 Water Distribution and Sewage Collection Systems Plans (including building services)

Provide all existing utilities and above ground features, including sizes and material types, which may pose as an obstacle (i.e., water, sewer, gas, electrical, etc.) on the basic site plan layout. Indicate existing pipe material and sizes where new lines connect along with the type of connection and elevations of connections. Provide all new water and sewer lines with sizes. This will include all new service lines, up to within the 1.5 meter building line. Locations of all new manholes, fire hydrants, valves (including PIV's), similar appurtenances, and connection points shall be provided. Show contours on plan view. Include stationing on both plan and profile sheets.

1.4.1.2 Water Distribution and Sewage Collection Systems Profiles

Profiles of all gravity sewers and waterlines shall be provided. Profiles may be omitted for short waterlines, unless necessary to assure adequate cover or avoid interference with other underground facilities. Indicate existing pipe material and sizes where new lines connect. Indicate type of connection and elevation. Include all interference elevations.

1.4.1.3 Water Distribution and Sewage Collection Systems Details

Appropriate water and sewer details shall be provided. Use Omaha District standard detail drawings. The standard detail sheets will be furnished if required. For roadway pavement crossings, indicate installation method (open cut, boring, jacking, trenchless excavation, etc.). Include standard casing details.

1.4.2 Specifications

Specifications shall be coordinated with the plans and include all items. Provide special sections to cover those subjects for which no UFGS guide

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specifications are used or available. These special sections shall include all approved changes from the 60 percent review stage. All UFGS guide specifications, to be provided, shall be in edited form showing all text to be deleted and added.

1.4.3 Design Analysis Narrative

Design analysis shall include the following and all applicable data contained in the 60 percent design analysis narrative shall be repeated. References shall not be made to the previous design analysis. The final design analysis shall be corrected to reflect changes in content made in response to review comments, and shall be expanded to reflect the completed design.

1.4.3.1 References

Provide design references used in preparing the water and wastewater design.

1.4.3.2 Water Supply and Distribution Systems

A narrative of the water supply and distribution systems design and applicable criteria used shall be provided. Include the peak and average domestic demands, the interior and exterior fire flow requirements and the available flow and residual pressures. A description of the water distribution system, and complete calculations necessary to support equipment, piping sizes, interior and exterior fire demands, and domestic demands, etc. shall be provided.

1.4.3.3 Wastewater and Sewers

A narrative of the wastewater supply design and applicable criteria used shall be provided. Include the average and peak contributing flows along with the available capacity and full flow capacity of the existing system. A listing of allowable piping materials, and complete calculations necessary to support equipment and piping sizes shall be provided.

1.5 ARCHITECTURAL

1.5.1 Drawings

The drawings shall be complete, include all necessary and required details, thoroughly checked, and fully coordinated with the technical Specifications and all other Construction Documents. Previous comments and applicable criteria changes shall have been incorporated into the design. The contract drawings shall fully describe the type and the scope of work required. The layout of individual sheets and the organization of the assembled set shall follow and communicate a logical sequence. General information shall be presented first, progressing to more detailed information. When assembling details, begin in the upper left-hand corner of the sheet with letters progressing to the right and down. When dimensioning, use arrowheads, not dots or slashes. Where major structural elements are included as parts of architectural detailing, do not indicate sizes. These elements must be fully defined in the structural design documents. See 60% Architectural drawing submittal requirements for drawing scales of remaining drawings to be submitted. Include all drawings from the 60% submittal plus all

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additional detail drawings required for complete 100% design. These shall include but not be limited to the following:

- Interior Elevations and Details
- Door Details
- Window Details
- Louver Details
- Roof Details
- Stair Details
- Casework Plans, Elevations, and Details
- Wall Plan Details and Plan Details
- Fire Wall Details and Penetration Conditions
- Sealant Details
- Ceramic Tile Details
- Ceiling Details
- Control/Expansion Joint Details
- All Miscellaneous Details
- All Floor and Wall Patterns/Borders

1.5.2 Technical Specifications

The technical specifications shall be complete and fully coordinated with the drawings. Special sections shall be prepared to cover those subjects for which no pattern guide specification is available. Notes to the Designer that accompany specifications shall be used in editing technical guide specifications. All specification indexes shall be completely edited to reflect the paragraphs retained in the body of the specification. All UFGS guide specifications shall be edited in accordance with Section 01332 SUBMITTALS DURING DESIGN.

1.5.3 Design Analysis Narrative

The Design Analysis shall include the basic information presented in the previous submittal, corrected to reflect changes in content made in response to review comments. Outline specifications shall be omitted from the Final Design Analysis as the information is included on the final drawings and project specifications. The design analysis shall be written in the present tense.

1.5.4 Design Analysis Calculations

The Design Analysis calculations shall include the basic information presented in the previous submittal, corrected to reflect changes in content made in response to review comments.

1.5.5 Common Deficiencies

Some repeated errors have occurred in the preparation of design documents in the past. Subsequently these errors have been identified and the Contractor directed to make corrections. The work involved in such corrections becomes lost effort and time for the designer. Some of these errors which are most often overlooked include:

- a. Not using correct abbreviations or terminology on the drawings. Abbreviations must match what is used on the standard abbreviation sheet and terminology must match what is used in the standard technical guide specifications.

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b. Not using the correct scales, north arrow designation, section cut system, or incomplete dimensioning on the drawings.

c. Not providing sufficient space for door operation hardware at doors which swing into a wall running perpendicular to the opening. 100 mm minimum is required between edge of door frame and perpendicular walls.

d. Not providing correct and complete Design Analysis information written in the present tense. The Design Analysis will be written following the format indicated herein. A separate Fire Protection section in the Design Analysis with input from all disciplines is one area which is often overlooked and shall be included.

e. Not providing a structural stoop at exterior doors where the slab is at the same approximate elevation as the interior floor. The use of simple slabs on exterior grade leads to lifting of the slab in below-freezing temperatures which interferes with the safe operation of the door.

f. Not correctly presenting or coordinating (to avoid interference) features of Fire Protection, Noise Control, and Physical Security.

g. Not correctly referencing and cross referencing building sections, wall sections, details, etc.

h. Failure to read/use technical notes in editing the Technical Guide Specifications.

i. Failure to coordinate all disciplines prior to submittal of projects for review.

j. Improper use of fire-retardant wood. Fire-retardant wood is combustible; its use in buildings that are of noncombustible construction is extremely limited (see UBC for the minor allowable uses). Because of the potential for severe degradation, fire retardant plywood shall not be used in a roof or roofing system, or in structural applications.

k. Incorrectly listing trade names in door hardware specifications in lieu of ANSI numbers and failure to correctly specify hardware finishes.

l. Control joints in CMU walls and brick expansion joints in face brick are not shown on both architectural plans, elevations and structural plans, or are inconsistent. Note also control joint locating and coordination for floor tile per Tile Council of America recommendations.

m. Failure to delete all publications which do not apply to the particular project.

n. North is not oriented the same direction on all sheets (civil, site, arch).

1.6 INTERIOR DESIGN

1.6.1 Definitions

(a) Military interior is classified into two categories: *Structural Interior Design* (SID), and *Comprehensive Interior Design* (CID).

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(b) Structural Interior Design is the design for all the building related interior finishes such as walls, ceiling, floor coverings, etc., and may also include prewired workstations.

(c) Comprehensive Interior Design is the design for all the interior furnishings and the finishes related to them.

(d) Completion of an SID involves the selection and sampling of all applied finishes for the building's interior features, and may include drawings and specifications for prewired workstations. The SID package will include interior floor plans and interior color samples. If necessary, it will also include interior elevations showing finish placement and all information for prewired workstations. The products and materials specified are purchased and installed by the General Contractor.

(e) Completion of a CID involves the selection and sampling of the furnishings components of the interior environment in addition to the structural interior design. This may include systems furniture, freestanding furniture, artwork, and accessories. The CID package will include furniture placement plans, information on all freestanding furnishings and accessories, furniture cost estimates, and order data sheets. The products and materials listed are purchased by the Government.

(f) The interior designer should identify items in the SID or CID that require attachment to the building by cutting or fitting, and should prepare construction drawings and specifications to cover these operations. These items must be properly coordinated with other work on the project.

(g) When indicating manufacturers' product styles and colors for a project, use a Color Guide Specification that covers the color of the exterior and interior materials and products that will be exposed to view in the finished construction, and that will be sampled in the SID and CID binders. Specific locations where materials are required are to be shown on the drawings via a standard material, finish, and color schedule. Key the color codes used on the drawings with the products indicated in the Color Guide Specification. The Color Guide Specification should include a non-proprietary disclaimer that reads: "Trade names indicated are non-proprietary and are intended only to indicate color, texture, and pattern." See Appendix D for an example.

(h) Federal Standard Colors are not required on interior design projects, but may be used if desired.

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(i) Design Requirements

The Contractor shall use the Guide Specification SECTION 09915 COLOR SCHEDULE and the Contract Drawings for the development of the SID exterior and interior finishes, materials, and colors. The SID shall run concurrent with the architectural submittal. The Contractor shall update the color boards and the Guide Specification to reflect any of the Government comments or discontinued manufacturer colors indicated. The final SID finishes accepted at the 95% design phase shall be the SID finishes installed during the construction phase of the project.

1.6.2 Presentation Format

(a) SID and CID information and samples are to be submitted in 216 mm by 279 mm format in separate 76 mm ring binders with pockets on the inside of the covers. When there are numerous pages with thick samples, more than one binder should be used. Large D-ring binders are preferred to O-ring binders. Fold out items should have a maximum spread of 648 mm.

(b) Each binder should be labeled on the outside spine and front cover with the following information:

- Phase %
- SID or CID
- Project Title and Number
- Location
- Date
- A-E firm
- Volume Number (e.g., Vol. 1 of 3)

(c) Each sheet within the binder should be labeled with the project title, location, A-E firm name, and sheet number.

(d) Label all finish samples with the material codes used in the Contract Documents.

(e) Color boards should be sturdy enough to support all samples. Use page protectors that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Samples which are difficult to fasten should be labeled with the finish code so they can be identified independently.

(f) Material and finish samples should indicate true pattern, color and texture. Photographs or colored photocopies of materials or fabrics will be disapproved. Carpet samples should be large enough to show a complete pattern or design. If the specified carpet has a large pattern, provide a color photograph showing the overall pattern in addition to the carpet sample. Color photocopies of artwork and plants are acceptable.

1.6.3 Information On Required Drawings

(a) The Composite Floor Plan should show all panels, components and free-standing furniture in relationship to the building and the building systems. This includes information on locations of light switches, fire pull boxes, mechanical devices, and other wall-mounted items. It should be a full size contract drawing showing furnishing item numbers (where applicable). The gross and net area (square meters) of each floor should be noted on the composite floor plans.

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1.6.4 Health, Safety, Accessibility, And Environmental Quality

(a) Fire safety is one of the paramount concerns in any design. Designers must comply with all appropriate fire safety codes and provide for safe egress in the event of fire. Also, comply with regulations relating to flammability of interior materials and furnishings.

(b) All designs, including signage, must comply with the Americans with Disabilities Act (ADA) or the Uniform Federal Accessibility Standards (UFAS), whichever is the most stringent.

(c) Interior design for the military should incorporate the concept of pathway finding. The space plan, the use of color and pattern, and the interior sign package should coalesce to form a well-organized, comprehensible interior environment that guides users and visitors through the building to their destination.

1.6.5 Specific Information For Sid Submittals

(a) This section gives information on assembling an SID package. The Submittal Matrix gives the sequence of assembly and tells what information must be included in each submittal. Note that Interior Design Submittals **must** run concurrent with Architectural Submittals.

Submittal Matrix Summary for SID Packages:

Item	Description	65%	100%	RTA
1	Title Page	X	X	X
2	Table of Contents	X	X	X
3	Narrative of Interior Design Objectives	X	X	X
4	Interior Color Boards (relating to color placement plan)	X	X	X
5	Interior Signage Color Boards	X	X	X
6	Interior Floor Plan (1:50 for full size drawings. Use metric scale when required.)	X	X	X
7	Room Finish Schedule / Color Key	X	X	X
8	Signage Plan		X	X
9	Diskette of all Drawings/Plans/Schedules			X

Separate sign drawings should be prepared which indicate plaque size, type, location, and message for all signs. Submit a sample of the sign color in the SID.

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(b) Some of the items which are usually included in an SID are listed below:

- Carpet
- Resilient Floor Coverings
- Ceramic Tiles and Stones
- Terrazzo
- Paint
- Wallcoverings
- Wood Stains
- Wall Base
- Ceiling Tiles and Grid
- Plastic Laminates
- Built-in Casework
- Auditorium Seating (Fixed)
- Blinds and other Window Coverings
- Marker Boards/Bulletin Boards
- Prewired Workstations
- Toilet Partitions
- Moveable Room Dividers
- Cubicle Curtains
- Signage
- Stage Curtains
- Trim and Hardware Finishes
- Decorative Light Fixtures

1.6.6 Specific Information For CID Submittals

(a) This section gives information on assembling a CID package. The Submittal Matrix gives the sequence of assembly and tells what information must be included in each submittal if that work is a part of the design contract.

If the client is purchasing and installing the systems furniture, all systems furniture should be shown in the contract drawings with the note "FOR INFORMATION ONLY".

Submittal Matrix Summary for CID Packages:

Item	Description	65%	100%	RTA
1	Title Page	X	X	X
2	Table of Contents	X	X	X
3	Narrative of Interior Design Objectives	X	X	X
4	Generic Composite Floor Plans with Conventional and Systems Furniture on full size sheet.	X	X	X
5	Manufacturer's Summary Lists		X	X
6	Conventional Furniture Placement Plans.) All areas.	X	X	X
7	Conventional Furniture Illustration Sheets with number codes (all areas)	X	X	X
8	Artwork Illustration Sheets /Artwork Placement Plans	X	X	X
9	Itemized Furniture Cost Estimate	X	X	X
10	Order Data Sheets(all areas)	X	X	X
11	Letter of Justification for Waiver (if required)	X	X	X
12	Diskette of all Drawings/Plans/Schedules			X

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(b) The Manufacturer's Summary List is a list of all the manufacturers whose products are used in the CID package. For each manufacturer, provide the name, address, phone number, fax number and a point of contact.

(c) A Furniture Placement Plan is a plan of one room showing each furniture component in the room. There will be one Furniture Placement Plan for each room in the Composite Floor Plan that contains furniture. Furniture Placement Plans are drawn at 1:50 if possible, or at 1:100 if the room or area illustrated is very large. Each Furniture Placement Plan should include the following information:

- The job name, location, and date
- The footprint of the room
- The furnishings
- The room name and number
- A Furnishing Item Number for each furnishing item
- Quantity of each product specified for the
- CID

(d) Provide one Furniture Illustration Sheet for each item of furniture in the CID. The Furniture Illustration Sheet should include all of the following information:

- The job name, location, and date
- A picture or line drawing of the product specified
- The furnishing item number which keys the product to the Composite Floor Plan and the Furniture Placement Plan
- The options specified, if any
- Specification data on the finishes and fabric
- Samples of the finishes and fabric
- A comprehensive list giving all occurrences of the item, broken down by room. For example:
 - 4 each Room 104 Commander
 - 2 each Room 103 Receptionist

(e) Furniture Illustration Sheets should be arranged in numerical order by furnishing item number. The furnishing item numbers should begin with 001. See Appendix A for an example Furniture Illustration Sheet.

(f) An Artwork Placement Plan shows the spatial relationship between the furniture and the artwork in a room. There will be one Artwork Placement Plan for each room in the Composite Floor Plan that contains artwork. Assign a furnishing item number to each piece of artwork. The Artwork Placement Plan will include the furnishing item number for the artwork and but will show the furniture without item numbers. Artwork Placement Plans are drawn at 1:50 if possible, or at 1:100 if the room or area illustrated is very large. Each Artwork Placement Plan should include the following information:

- The job name, location, and date
- The room name and number
- A plan of the room locating the artwork
- An elevation of each wall containing artwork showing mounting height
- A Furnishing Item Number for each artwork item

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- Quantity of each product specified for the CID

(g) Provide one Artwork Illustration Sheet for each piece of art in the CID. The Artwork Illustration Sheet should include the following information:

- The job name, number, location, and date
- The title of the artwork and the artist's name.
- A picture of the proposed artwork. Color photos are acceptable
- The furnishing item number, which keys the artwork to the Composite Floor Plan and the Artwork Placement Plan
- Name and number of the room where artwork will be displayed
- Frame description and sample of mat colors
- Mounting height and installation instructions
- Specify security mounting if required

(h) The itemized furniture cost estimate lists all furnishings and indicates quantities, unit costs and totals. It is organized according to UNICOR and GSA/FSC Group, Part, and Section of the FSC Schedules. The cost estimate should also include a 10% general contingency and 7% installation listed as separate line items. Estimated freight charges that are not included in furniture cost should also be a separate line item.

(i) The Order Data Sheets provide all information necessary to order the furnishings specified in the CID. Only one item should be listed per data sheet. The sheets should be in numerical order. The Order Data Sheet should include the following information:

- Furnishing item number.
- The job name, location, and date
- FSC Group, part, and section
- GSA Contract Number, Special Item Number (SIN), and contract expiration date
- Maximum Order Limitation
- Source and manufacturer's name (Include ordering address, telephone number and fax number)
- Product name
- Product model number or National Stock Number (NSN)
- Finish name and number
- Fabric name and number
- Dimensions
- Weight
- Description (Include construction information, fabric content, finish application, etc.)
- Justification (Example: "These guest chairs are coordinated to match the task seating at each workstation. The size of the guest chair is critical because of the limited space where they are to be placed. If this company is not selected, coordinate the newly proposed finishes with furniture item numbers #001, 002, 003.")
- Item location by room number
- Quantity per room
- Total quantity
- Unit price

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- Total price
- Estimated freight charges, 7% of item cost (Note whether or not freight charges are included in the price of the CID item.)
- Special instructions (if any)

(j) Request for UNICOR Waiver: Address letter to the applicable UNICOR Regional Marketing Center.

Dear Sir:

In accordance with Title 18 U.S.C. 4124(a) and Federal Acquisition Regulation subpart 8.6, this installation is requesting a waiver to purchase systems furniture from _____ or any other furniture company that can meet our minimum requirements. Our minimum requirements with respect to product specifications, delivery and installation, and budget restrictions must be met.

{Provide a comparison of price and pertinent technical differences between item requested and item being compared. Include statements justifying inadequacies of item being compared in performing required functions, and the advantages (such as technical, economic or other) of the item requested.}

Enclosure (1) details our minimum product requirements. Enclosure (2) states our minimum requirements for delivery and installation. Enclosure (3) includes information on the required typical workstations and a listing of the products and approximate cost for our minimum requirements.

Please evaluate this request for the waiver and provide an answer prior to _____ to ensure that contracts are awarded in a timely manner. Your cooperation in this matter is most appreciated.

Sincerely, etc.

(k) General Design/Cost Information for CIDs: Furniture may be obtained from three categories of sources: UNICOR, GSA Federal Supply Schedule, and open market. Every effort should be made to use UNICOR or GSA Stock/Federal Supply Schedule items for CID projects. There may be occasions when there is no current FSS/GSA or UNICOR resource for a furnishing requirement, or when items available on FSS/GSA contract or from UNICOR do not meet the functional requirements of the project. If the latter occurs, the Base Contracting Officer must submit a Request for Waiver to UNICOR. (See the following example.) The A-E shall assist in the waiver process by providing the information within the brackets of the sample letter below. GSA sources are not mandatory for DoD projects, but all procurement procedures must be followed as stated in the FAR. Open market line items over \$2,500 will require a justification letter. Open market line items over \$25,000 will have to be solicited by bid, and solicitation documents including detailed specifications will be required. Line items under GSA contract that exceed the Maximum Order Limitation (MOL) will also require a formal solicitation for bid.

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Projects that are funded with non-appropriated funds (NAF) are exempt from the UNICOR mandatory resource, and a waiver is not required in order to use open market sources on these projects. The Air Force Non-Appropriated Fund Purchasing Office (AFNAFPO) has contracts with many furnishings vendors and is an additional resource for these types of projects. Their address is:

Air Force Services Agency / SVCKH
9504 IH 35 N, Suite 370
San Antonio, TX 78233
Phone: (210) 652-6931
Fax: (210) 652-6309

(1) The furnishings which are usually included in a CID are listed below.

- ADP tables/printer stands/support furnishings
- Artwork
- Audio-Visual support furnishings
- Beds, wall units, night stands, chests, mirrors, refrigerators
- Bedspreads, bedding, mattresses, box springs, bed frames or boxes
- Bookcases
- Bulletin boards, projection screens/marker boards (if NOT attached to structure)
- Carts
- Chairs - all seating types except those attached to structure
- Desks - unless included in furniture system
- Drafting tables
- Draperies
- Files
- Freestanding partitions
- Lamps
- Library furniture
- Lounge furniture - sofas, chairs, occasional tables
- Mobile furnishings - unless included in furniture system
- Modular desk units
- Podiums, lecture stands
- Silk plants
- Storage - all kinds
- Systems furniture workstations (if not in SID)
- Planters, waste and ash receptacles
- Tables - all kinds
- Wardrobes (if not in the construction contract)

1.6.7 Technical Specifications

Appropriate UFGS guide specifications shall be provided and coordinated with the drawings and design analysis. Specifications shall be edited to identify proposed product and installation requirements. Use SECTION 09915 Color Schedule to specify exterior and interior finish colors. Where materials or installation requirements are not covered in the provided specifications, information shall be prepared to cover these items. In addition to guidance provided in SECTION 01332 on editing technical specifications, data and sample submittals for all interior and exterior finishes (including but not limited

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to interior design and architectural specifications) shall be "GA 1" submittals.

1.6.8 Submittal Requirements

Refer to Section 01332 Submittals During Design for Interior Design submittal requirements.

1.7 STRUCTURAL

1.7.1 Drawings

Final drawings shall be complete, thoroughly checked, and fully coordinated with the other disciplines, specifications and all other construction documents. Previous comments and applicable criteria changes shall have been incorporated into the design. The drawings shall be complete with all plan views, elevations, sections, details, schedules, diagrams, and notes necessary for the construction of the project. For structural steel framing, the drawings shall meet the requirements for design drawings set forth in the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings. All structural steel members and connections shall be fully detailed. Design of structural steel connections shall be the responsibility of the structural design engineer and shall not be delegated to the steel fabricator. For structural concrete, the drawings shall conform to the standards for engineering (design) drawings set forth in the ACI Detailing Manual-1988 (SP-66). Additionally, those items described below which are applicable to the design shall be incorporated into the drawings. Drawings shall be at a scale appropriate for the design, in no case however, shall plan type drawings be done at a scale smaller than 1:100 or detail type drawings at scale smaller than 1:20.

1.7.1.1 Grid Systems, Dimensions, and Floor Elevations

Each foundation and slab plan, floor framing plan and roof framing plan shall have an alpha-numeric grid system aligned with any columns or pilasters, or with load bearing and non-load bearing walls, as applicable. The same grid system shall be used for all plan views. Each plan view shown shall have all necessary dimensions. On plan views, the dimensions shall define the location of grid lines, offsets, and all structural elements, as well as the overall sizes of the structure. The finish elevation of the ground floor slab shall be indicated as 10000mm, and elevations for all other structural elements shall be numerically referenced to this basic elevation.

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1.7.1.2 Plan Sheets

a. Foundation and Slab Plans:

Foundation and slab plans shall show the size and location of all foundation elements, such as foundation walls and footings. Elevations for footings shall be indicated on the plan. Plans for slabs-on-grade and exterior stoop slabs at building entrances shall show location and type of joints, slab thicknesses and reinforcing, elevation of slab surfaces, and any other design features, such as equipment bases and areas of depressed slab surface, which affect the slab design. Also, indicate that slabs are placed over vapor barrier and capillary water barrier.

b. Roof Framing Plans:

Roof framing plans shall be provided for all parts of the structure. Plans shall show the size, spacing, and location of all roof framing members, their supporting columns, pilasters or walls, all auxiliary members such as bracing and bridging, orientation and extent of coverage of structural roof deck materials, and the size, location, and framing of all major openings through the roof.

1.7.1.3 Elevation Views, Sections and Details Sheets

Elevation views, sections and details necessary to illustrate fully the design shall be provided. Some requirements peculiar to the various structural materials are described below.

a. Concrete:

Include elevation views as necessary, plus sections and details to show the outlines of concrete cross-sections, reinforcing bar arrangements, concrete cover for rebar, installation of embedded items, and joint construction. All lap splice and embedment lengths for reinforcing bars shall be clearly indicated on the drawings. A sill detail for each foundation condition at exterior and interior doors shall be provided.

b. Masonry:

Wall reinforcing shall be located and identified on plans, in section cuts, elevation views or in schedules. Structural elevations when needed shall be included to clarify the construction requirements for masonry reinforcement, especially the reinforcement around wall openings. Details applicable to the project shall be shown on the structural drawings. Listed below are some frequently required masonry details, most of which are shown in Army Corps of Engineers TI 809-04, Air Force Technical Manual AFM 88-3, Chap. 3, and on the Typical Masonry Sheets. The Typical Masonry Sheets will be provided to the successful offeror upon request and may be edited and incorporated into the final drawings as needed. Additional details as required shall be extracted from other sources and incorporated into the final drawings. All details shall be fully edited to reflect the specific requirements of this project. Supplemental details shall be added as necessary to complete the design.

Masonry Details Frequently Used:

- Masonry Control Joint (MCJ).

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- Control Joint at Bond Beam.
- Bond Beam Corner Reinforcement.
- Seismic Reinforcement Around Wall Openings.
- Wall Reinforcement Details for 1 and/or 2 bar-per-cell stiffeners.
- Doweled or Other Connection of Masonry to Foundation, Floor, Roof or Bond Beam.
- Bond Beam (or Steel) Lintels and Bearing Details.
- Lateral Support Detail for Top of Masonry Partition Walls (lateral support locations must be shown on framing plan sheets).

c. Structural Steel, Steel Joists, and Steel Decking:

Structural steel connections shall be fully detailed and shown on the drawings. The anchorage of beams, trusses, joists, and steel deck to walls or other bearings, and the extra framing or reinforcement required at deck openings shall also be detailed. Notes, details, or schedules on the drawings shall indicate the steel deck attachment method to be used, and shall give the size and spacing for perimeter, side lap, intermediate supports and end lap attachments. Welded connections shall be detailed using standard weld symbols illustrated in AWS D1.1. All applicable weld sizes, spacing, types, contours and finishes shall be shown.

1.7.1.4 Schedules

a. Foundation Schedules:

Foundation schedules for footings shall be included, as applicable. The schedule shall include all pertinent information required for the foundation system being used.

b. Framing Schedules:

For concrete framing, beam and column schedules shall conform to the requirements of the ACI Detailing Manual. For structural steel framing, provide a column schedule complete with column base plates and design loads at splices, if any, and at column bases.

1.7.1.5 Equipment Loads

All equipment loads which exceed 44N and are not supported by concrete slab-on-grade shall be identified on the drawings by showing equipment locations, total weights, and reaction loads at support points.

1.7.1.6 Notes

a. Design Notes:

Under the heading "Designer's Notes," the structural drawings shall contain notes which begin: "The structural design was prepared using the following data:". The data then listed shall include the structural loading criteria used for design, such as roof and floor live loads, snow load design parameters, wind speed and wind load design parameters, seismic design parameters, allowable soil bearing pressures (as recommended by the Final Foundation Analysis report), foundation design depth, design wind uplift pressures for steel joists and other data pertinent to future alterations. Also, to be listed are the ASTM designations and stress grades of the

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applicable structural materials: steel, masonry, concrete for each usage, reinforcing bars, welds, and bolts.

b. General Notes:

Other notes, which direct the work to be performed, the materials to be used, etc., shall be grouped under the heading of "General Notes." Included in these notes should be a description of the building's structural system, if necessary.

1.7.2 Specifications

Technical specifications for final design shall be prepared in accordance with the instructions provided in Section 01332 SUBMITTALS DURING DESIGN, Paragraph 3.2 "Specifications". The technical specifications shall be complete and fully coordinated with the drawings. All specification indexes shall be completely edited to reflect the paragraphs retained in the body of the specification. All references that have not been used in the body of the specification shall be edited from the technical specification.

1.7.3 Design Analysis Narrative

The final design analysis narrative shall repeat and expand upon the basic information presented in the 60% design analysis narrative, and shall be corrected to reflect revisions made for the final design.

1.7.4 Design Analysis Calculations

Calculations shall be prepared by an experienced structural engineer and shall include an investigation of loading, (gravity, wind, seismic, etc.) shear, moment, wind uplift, stability and deflection calculations. The computations are to be systematic and accurate. Similar beams, columns, panels, or connections may be grouped by designing the largest member or connection in the group, but every individual slab, beam, column, footing, connection or other structural member or structural consideration indicated by the plans shall be accounted for by pertinent calculations, statement or reasoning, or reference to source. Design formulas shall be written out in symbols the first time each is used, before the numerical values are supplied. All answers shall be identified by dimensional units. Basic assumptions of loads, working stresses, and methods of analysis must appear in the calculations; these assumptions must be applied consistently to a given problem. The calculations shall be presented in a clear and legible form, incorporating a title page, table of contents, and a tabulation showing all design loads and conditions. Pages shall be numbered consecutively and identified in the table of contents. Cross-referencing shall be clear. The source of loading conditions, formulas, and references will be identified. Assumptions and conclusions will be explained. Superseded areas of computations must be ruled out. All computations shall be given a complete numerical and theoretical check within the Contractor's office. Calculation sheets shall carry the names or initials of the developer and the checker, and the dates of calculations and checking. No portion of the design calculations shall be developed and checked by the same individual.

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1.7.4.1 Computer Calculation Submittals

All applicable input and output data shall be included in readable printed form as part of the design calculations. Continuous paper such as that used in computer terminals or printers shall be cut into individual pages and shall not be submitted in a continuous roll form. All input and output data shall include a brief synopsis of the computer program(s) stating required input, method of solution, approximations used, codes and specifications used, output generated, extent of previous usage or certification of the program(s), and program author(s). Generalized flow chart(s) may be used to supplement description of solution process, if desired. All computer-generated and long-hand calculation sheets shall be identified by sheet number, indexing and cross-referencing. Each member or structure being analyzed shall be identified, dimensioned and shown in a loading diagram. A separate diagram shall be provided for each load case, such as dead plus live, dead plus wind, etc. Input and output values including intermediate values shall clearly be identified if such values are necessary for evaluation of the submittal.

1.8 MECHANICAL

The 100 percent final design submittal shall include all the information presented in the 60 percent submittal, updated to final design status, corrected to reflect any changes made in response to review comments, and shall include the additional requirements specified hereinafter. Any concerns in developing the final design documents shall be resolved prior to starting the final design stage.

1.8.1 Design Drawings

The final design drawings shall be fully coordinated with the design analysis and specifications. Provide sufficient plans, piping diagrams and isometrics, mechanical room sections, water and air flow diagrams, details, schedules, control diagrams, sequences of operation, etc., as necessary to define the design requirements. Large-scale plans of congested areas shall be provided. Coordinate with architectural design for provision of access panels for all concealed valves, traps and air vents, etc. Floor plans shall use the architectural floor plans as a basis, with the building outline half-toned. The final design drawings shall include all the requirements and drawings defined for the 60 percent submittal. In addition, the following new drawing requirements and drawings shall be provided:

1.8.1.1 Mechanical Abbreviation, Legend, and General Notes Sheet

On this sheet, include any mechanical general installation notes that may be required to clarify the construction intent that may not be readily apparent in the specifications or on the drawings. General notes may be provided on a separate sheet if space does not exist on the Abbreviation and Legend sheet.

1.8.1.2 Plumbing Drawings

Enlarged Toilet Room Plans:

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Enlarged toilet room plans showing all fixtures, water, waste, and vent piping shall be provided for each toilet area. Enlarged plans shall be drawn at a minimum 1:50 scale.

1.8.1.3 Mechanical HVAC Drawings

Hot Water System Flow Diagrams:

Provide hot water flow diagrams showing the boiler, pumps, and all connected heating equipment. Each equipment item shall show associated flow rate. All thermometers, pressure gauges, isolation and control valves, bypass piping, etc., shall be shown on the flow diagram.

Chilled Water System Flow Diagrams:

Provide a chilled water flow diagrams showing the coolers, pumps, and all connected cooling equipment. Each equipment item shall show associated flow rates. All thermometers, pressure gauges, isolation and control valves, bypass piping, etc., shall be shown on the flow diagrams.

1.8.1.4 HVAC Control Drawings

In addition to the updated Controls Legend and System Block Diagram Sheets, final HVAC control drawings for each system and item of equipment shall be in accordance with the following requirements:

Control Diagrams:

Control Diagrams shall be provided for each system or item of equipment. Systems diagrams shall include every major component installed in or connected to the system, and only one system shall be shown on each diagram. Control Diagrams shall schematically show all sensors, controllers, actuators, indicators, and operator interface devices that are required for the complete automatic control and monitoring of the system. All sensing devices utilized in the control or instrumentation of the system, and all actuating devices shall be shown in their correct mechanical location and functionally interconnected to the other control devices which comprise the control loop. All controlling devices shall be shown with all functional interconnections to inputs and outputs. Each sensing, controlling, actuating, and indicating device shall have its own unique control loop tag identifier. Communication linkages required to complete the entire intended interface between operators and the control system shall be shown schematically. This includes interconnections between local temperature control panels and the base EMCS. All associated thermometers and pressure gauges, located in their correct mechanical locations, shall also be shown on the diagrams. See furnished Example HVAC Control Drawings for the required level of detail and formatting.

Sequence of Operations:

Sequence of Operations shall be provided for each item of equipment or system and shall fully describe the intended operation of the equipment or system in all different operating modes. As identified on the furnished Example Control Drawings, each Sequence shall be broken down by individual control loops and shall include descriptions of both normal operating modes (running, shutdown, standby, etc.) and abnormal, emergency or safety related modes. Sequences shall include a description of all indication

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instrumentation, alarm conditions, and automatic actions to be taken upon occurrence of alarm conditions. Each device referenced in the sequence shall be referred to by its unique tag identifier, with each component designator shown in parenthesis. Design setpoints shall be specified for each control loop and indicated as being adjustable. See furnished Example HVAC Control Drawings for the required level of detail and formatting.

The designer shall analyze every component of each system and write each Sequence of Operation to compliment the Functional Performance Checklists. The Sequence of Control on the project drawings shall be explicit and written to ensure that all the requirements of the "Functional Performance Test Checklists" can be accomplished.

Control Points Lists:

Control points lists, identifying each temperature control system input and output, shall be developed for each temperature control panel. See furnished Example HVAC Control Drawings for the required level of detail and formatting.

1.8.2 Technical Specifications

The submitted 60 percent technical guide specifications shall be updated, completely edited, and fully coordinated with the drawings to accurately and clearly identify the final product and installation requirements for the facility.

1.8.3 Design Analysis Narrative

The Final Design Analysis Narrative shall include the information presented in the 60 percent submittal, shall be corrected to reflect changes in content made in response to review comments, and shall be expanded to reflect the completed design.

1.8.4 Design Analysis Calculations

The Final Design Analysis calculations shall include all the information presented in the 60 percent submittal, shall be corrected to reflect changes in content made in response to review comments, and shall be expanded to reflect the completed design. In addition, the following new calculations shall be provided:

- a. Pipe sizing calculations for the chilled and heating hot water, plumbing, and gas piping systems.
- b. Chilled and heating hot water pump head calculations.
- c. Chilled and heating hot water expansion tank sizing.
- d. External static pressure calculations for all fans.
- e. Control Valve CV calculations.
- f. Electrical/Communications room calculations

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1.9 ELECTRICAL

1.9.1 Drawings

Drawing scale shall match architectural drawing requirements.

1.9.1.1 Interior Drawings

Drawings shall be complete and accurate in every detail and shall include arrangements and types of light fixtures, receptacles, switching, location of special features, necessary details, including legends, fixture schedule, panel schedules, one-line diagrams, layout or functional diagrams for each of the various systems, riser diagrams if applicable, estimated maximum demand for each panel and for entire building and any other relative information which will help clear up any and all questionable items on the plans or in the specifications toward the development of a set of plans which will be clear, concise and correct. Additional drawing requirements for specific equipment or systems have been included in subsequent paragraphs pertaining to the equipment or systems.

1.9.1.2 Floor Plans

All rooms must be identified by name and number. Plans must be legible. Plans shall be developed using the same scale and areas as the architectural floor plans. Separate floor plans must be provided for lighting, power, communications, and fire detection. On lighting and power plans, show all circuits and homeruns per requirement. Show all wire counts for lighting and power plans.

1.9.1.3 Diagrams

The power one-line diagram shall be on a dedicated sheet. The diagram should show ratings of major equipment including short circuit ratings. Power, communications diagrams, fire detection and telephone diagrams should be on separate sheets also.

1.9.1.4 Schedules

Provide panelboard and lighting fixture schedules. Panelboard schedules shall include the designation, location, mounting (flush or surface), number of phases and wires, voltage, ampacity and total connected and demand load. Indicate the trip rating, frame size, interrupting rating and number of poles for each circuit breaker in the panelboards. List the circuit number, circuit description and load for each branch circuit.

1.9.1.5 Exterior Drawings

Drawings shall be complete and accurate in all details and shall include the routing of all feeder and branch circuits.

1.9.2 Specifications

All specifications shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product, installation requirements, and testing methods for this facility.

1.9.3 Design Analysis Narrative

The text of the preliminary design analysis should be expanded to reflect the completed design. Calculations used to develop the design should be included. The document in its final form should conform in all applicable respects to the requirements of Section 01007 ELECTRICAL DESIGN REQUIREMENTS.

1.9.4 Design Analysis Calculations

Backup data shall be furnished to support basic design decisions related to sizing of major equipment and materials, selection of economic alternatives, performance of specific systems or equipment. Calculations may be performed by manual or computerized procedures. Use of standardized charts, curves, tables, and graphs will generally be acceptable for portions of required calculations or in lieu of specific calculation procedures. Such data must be from a recognized source which is identified in the design analysis. If possible, a copy of applicable sheets or pages should be included with the calculations. For given equipment, the calculations must conform to requirements identified under subsequent paragraphs herein pertaining to the equipment.

1.9.4.1 Service

Sizing of building service.

1.9.4.2 Transformers

Sizing of all transformers. (Generally for dry type transformers, 1 or 2 samples of detailed calculations to identify the method are sufficient, if input data for remaining units can be derived from panel or feeder sizing data.)

1.9.4.3 Feeders

Sizing of feeders (One detailed sample calculation is sufficient to establish the procedure, remaining data can be in schedules, tables, etc.).

1.9.4.4 Panelboards

Sizing and loading of panelboards and distribution equipment.

1.9.4.5 Voltage drop determination

Provide voltage drop calculations in accordance with IEEE 241 to demonstrate that the voltage drop requirements of NFPA 70 are satisfied.

1.9.4.6 Illumination calculations

Data should identify target and calculated illumination levels for all rooms and areas. Calculations should be adjusted to compensate for special applications -- irregularly shaped rooms, open sides, ceiling obstructions (beams, ductwork), corridors, etc. If the lumen method is used for corridor calculations, the calculations should be performed using a module in which the length doesn't exceed 3 times the width (2:1 ratio preferred).

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1.9.4.7 Short Circuit Evaluation

Calculate the fault current in accordance with IEEE 242 for each node in the electrical distribution system.

1.9.4.8 Protective Coordination Analysis

A protective coordination study shall be performed to show that the power system is selectively coordinated and is fully coordinated with the upstream overcurrent devices. The study shall include the interior electrical distribution system and primary distribution system back to the existing primary line. The protective coordination/short circuit study shall be complete and approved by the government before any changes are made to the existing equipment.

1.9.4.9 Specialized Applications

Additional engineering backup should be included to address special requirements such as accommodation of nonlinear loads, harmonics analysis, energy studies, etc.

1.10 COMMUNICATIONS DESIGN

- a. Incorporate all accepted Submittal S-5 review comments.
- b. Complete all design and construction documents.

1.11 FIRE PROTECTION

1.11.1 Drawings

Design will be an extension of the 60% submittal, incorporating all comments thereto and any revised criteria, all as specifically directed by the District Office. All conflicts, lack of specific criteria, and/or direction, inconsistencies, ambiguities, and lack of thorough understanding of the nature and scope of work shall be resolved prior to starting final design work. The fire protection plans shall show the following: entire sprinkler system; fire partitions; building separations; other fire protection features.

1.11.2 Design Analysis

The final design analysis will be an extension of the 60% design analysis and shall be complete for every item covered in the design and will include, but not be limited to, the following:

- a. List of design criteria.
- b. Design conditions.
- c. Design calculations.
- d. Complete description of the building fire protection features.
- e. Other pertinent information of value for future use in construction contract administration, substantiation of design methods, or permanent record shall be included.

1.11.3 Technical Guide Specifications

The following UFGS guide specifications shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for the facility:

13930 Wet-Pipe Sprinkler System, Fire Protection

All items identified in the specifications not required shall be marked for deletion in accordance with the requirements of Section 01332 SUBMITTALS DURING DESIGN. Those items of equipment, materials, or installation requirements that are required are not permitted to be modified or changed from that presently shown. Government approval is required for the final submittal of these guide specs.

1.12 ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS

All environmental requirements that have been identified during the design process shall be include in the 100% Environmental Protection, Compliance, and Permits Design Analysis Chapter, the 100% Environmental Protection Plan, and/or Appendix to the Environmental Protection Plan.

1.12.1 Design Analysis Chapter

The Contractor shall update the chapter in the Design Analysis entitled: "ENVIRONMENTAL PROTECTION, COMPLIANCE, AND PERMITS". The updated chapter shall include additional summaries of environmental coordination, compliance, approvals, permits, and etc. required for the project. The Contractor shall include additional documentations of the coordination, discussions, phone conversation records, and/or letters required to assure that the project is in full compliance with all Federal, State, Regional, and local environmental laws and regulations. The Contractor shall included an updated list of environmental permits, approvals, notifications, etc. that are required for the project.

1.12.2 Environmental Protection Plan

The Contractor shall update the 60% Draft Environmental Protection Plan to include all additional environmental requirements identified. The updated plan shall be submit for final review and acceptance.

1.12.3 Appendix to the Environmental Protection Plan

As an Appendix to the Final Environmental Protection Plan, the Contractor shall submit copies of the completed permit applications and associated documents, notices, reviews, and/or approvals that are required for the project. Copies of all permits and/or approvals required for the project shall be included along with any additional requirements and/or conditions of the permits which are required during and/or at completion of construction.

1.12.4 NPDES Storm Water Permit

If the project requires coverage under the General NPDES Permit for Storm Water Discharges from a Construction Site, the Contractor shall submit the following.

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1.12.4.1 Notice of Intent (NOI)

Parts I and II of the Contractor's NOI shall be completed.

1.12.4.2 Notice of Termination (NOT)

Parts II and III of the NOT shall be completed.

1.12.4.3 Storm Water Pollution Prevention Plan (SWPPP)

Complete the Storm Water Pollution Prevention Plan. A SWPPP outline is available at ftp:\\ftp.nwo.usace.arm.mil/pub/ED/SWPPP/ file name: SWPPP.DOC or SWPPP.PDF.

1.13 SUSTAINABLE DESIGN REQUIREMENTS

Provide a list of planned sustainable design features incorporated into the design of this facility.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

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SECTION 01355

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1.1 REFERENCES

U.S. AIR FORCE (USAF)

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

ENGINEERING MANUALS (EM)

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1.2 DEFINITIONS

1.2.1 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

1.2.2 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.3 Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene etc.), waste thinners, excess paints, excess solvents, waste solvents, and excess pesticides, and contaminated pesticide equipment rinse water.

1.2.4 Installation Pest Management Coordinator

Installation Pest Management Coordinator (IPMC) is the individual officially designated by the Installation Commander to oversee the Installation Pest Management Program and the Installation Pest Management Plan.

1.2.5 Land Application for Discharge Water

The term "Land Application" for discharge water implies that the Contractor shall discharge water at a rate which allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" shall occur. Land Application shall be in compliance with all applicable Federal, State, and local laws and regulations.

1.2.6 Pesticide

Pesticide is defined as any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant or desiccant.

1.2.7 Pests

The term "pests" means arthropods, birds, rodents, nematodes, fungi,

bacteria, viruses, algae, snails, marine borers, snakes, weeds and other organisms (except for human or animal disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; attack or damage real property, supplies, equipment, or vegetation; or are otherwise undesirable.

1.2.8 Surface Discharge

The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and would require a permit to discharge water from the governing agency.

1.2.9 Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

1.2.10 Wetlands

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and bogs. Official determination of whether or not an area is classified as a wetland must be done in accordance with WETLAND MANUAL.

1.3 GENERAL REQUIREMENTS

The Contractor shall be responsible for ensuring that the project is constructed in full compliance with all applicable Federal, State, Local and Regional environmental laws and regulations. The Contractor shall minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract. The Contractor shall be responsible for any delays resulting from failure to comply with environmental laws and regulations.

1.4 SUBCONTRACTORS

The Contractor shall ensure compliance with this section by subcontractors.

1.5 PAYMENT

All costs associated with this section shall be included in the contract price. No separate payment will be made for work covered under this section. The Contractor shall be responsible for payment of fees associated with environmental permits, application, and/or notices obtained by the Contractor. The Contractor shall be responsible for payment of all fines/fees for violations or non-compliance with Federal, State, and local environmental laws and regulations.

1.6 CERTIFICATION REQUIREMENTS

An environmental agency may require design and construction documents to be certified by a Professional Engineer (PE) registered in the State of

Colorado. The Contractor shall comply with the certification requirements of the environmental regulatory agencies.

1.7 ENVIRONMENTAL COORDINATION, PERMITS, NOTICES, REVIEWS AND/OR APPROVALS

The Contractor shall be responsible for contacting the appropriate Federal, State, Regional, and local environmental agencies to identify all required environmental permits (construction and operating), notices, reviews, and approvals required for the project. Once the requirements are identified, the Contractor shall be responsible for coordinating the requirements with Schriever AFB's Environmental personnel and the Contracting Officer in regard to implementation for a Federal Facility project. The Contractor shall ensure that all coordination, permits, notices, reviews and/or approvals are completed with each applicable phase of the design prior to construction starting for that phase. The Contractor shall be responsible for any contract delays resulting from failure to obtain environmental permits, notices, reviews and/or approvals when required.

1.7.1 Applications, Supporting Documents, and Fees

The Contractor shall obtain and complete all environmental permit applications and notices including any documents required for a modification for an existing permit held by the Facility. The Contractor is responsible for preparing all supporting documents, including but not limited to engineering reports, emission surveys, diagrams, pollutant load calculations, etc. If, in lieu of permits, the governing agency requires review and approval of the design, the Contractor shall submit and obtain approval of the design and associated documents. The Contractor shall be responsible for all fees associated with the permits, applications, reviews, approvals, and notices.

1.7.2 Schriever AFB's Environmental Permits, Notices, Reviews, and/or Approvals

The following is a listing of permits, notices, reviews, and/or approvals which **may be** required for this project. This listing and requirements are not to be considered all-inclusive by the Contractor, but is provided as information to be used in successfully accomplishing the environmental compliances.

- a. In the State of Colorado, **EPA** has authority for the National Pollutant Discharge Elimination System (NPDES) on **Federal Facilities**. **If** construction activities results in the disturbance of 5 acres of land or more, coverage under the EPA Storm Water General Permit For Construction Activities (Colorado Permit No. COR10*##F) is required. The Contractor and the Omaha District Corps of Engineers shall be co-permittees. The Contractor shall be responsible for editing and applying Specification Section 01565 NPDES PERMIT REQUIREMENTS FOR STORM WATER DISCHARGES FROM CONSTRUCTION SITES.
- b. A State of Colorado Air Pollution Emission Notice (APEN) for Fugitive Dust Permit for Land Development is required, if construction disturbs surface areas of more than 25 contiguous acres **or** if surface areas of more than 1 acre are to remain disturbed more than six months. The Colorado Department of Public Health and Environment (CDPHE), Division Air Quality issues the permit. The Contractor shall be the permittee and the permit

is required prior to any construction starting on the project site. The submittal package to CDPHE shall include a completed Air Pollution Emission Notice (APEN), a Land Disturbance Dust Control Plan, the grading plan, the location plan, and the application fee. The CDPHE requires a minimum of 30 days for review of the package. Prior to issuing the Construction Permit, CDPHE requires the permittee to pay the cost of the review in addition to the application fee.

- c. An El Paso County Construction Activities Permit will be required **instead** of the State of Colorado Fugitive Dust Permit, **if** the land disturbance will be greater than 1 acre but less than 25 acres **and** will not exceed six months in duration.
- d. The Colorado Department of Public Health and Environment (CDPHE), Air Quality Division, may require an Air Pollutant Emission Notice (APEN) and a Permit-to-Construct for a new stationary source emitting an air pollutant. The Contractor shall review the State of Colorado Air Quality regulations for applicability of an APEN and the air permit requirements as well as the Colorado State Standards of Performance for New Fuel Burning Equipment to determine if an APEN and/or a Permit-to-Construct is required. In addition, the Contractor shall be responsible for coordination with Schriever AFB Environmental Flight for compliance with the Facilities Air Permit and shall coordinated all requirements with the Contracting Officer.
- e. The Colorado Water Quality Control Act and Regulations promulgated thereunder requires that the construction or expansion of any domestic wastewater treatment works with a design capacity of pumping more than two thousand gallons per day have approval of the site location and of the design of the construction or expansion. The Contractor shall be responsible for obtaining the approval of the site and the design of **any expansion and/or lift stations** that meets these requirement. The Contractor shall be responsible for completion of application, associated design documents, and all requirements for the site approval process in accordance with the State requirements. The Contractor shall be responsible for payment of all fees associated with the review and approval. In addition, the Contractor shall be responsible for coordination of the site approval process with Schriever AFB's Environmental Flight and the approving agencies. The Contractor shall attend all local government board meetings required by the Pikes Peak Area Council of Governments for approval. The site approval process may require up to 4-5 months and should be started as soon as the location of the lift station and the design calculations are available. A Professional Engineer registered in the State of Colorado is required to certify the design documents and to certify that the expansion and/or lift station was constructed in accordance with the approved design.
- f. Coordination and Notification may be required prior to discharge of hydrostatic test water and disinfection water to the sanitary sewer and/or to the surface for land application. The Contractor shall be responsible for coordination with Schriever AFB and the Contracting Officer. The discharge shall be in accordance with all Federal, State, and local laws and regulations.

1.8 ENVIRONMENTAL PROTECTION PLAN

During the initial design phase, the Contractor shall submit an Environmental Protection Plan for compliance review and acceptance by the Contracting Officer. For each additional submittal phases, the plan shall be updated and submitted for compliance review and acceptance by the Contracting Officer. Prior to construction, the Contractor shall meet with the Contracting Officer for the purpose of discussing the implementation of the environmental plan, possible subsequent additions and revisions to the plan including any reporting requirements, and methods for administration of the Contractor's environmental plans. During Construction, the Contractor shall maintain the current version of the Environmental Protection Plan on the project site for review by interested parties.

1.8.1 Compliance

No requirement in this Section shall be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor shall be responsible for identifying, submitting for compliance review, and implementing any additional requirements to be included in the Environmental Protection Plan.

1.8.2 Contents

The environmental protection plan shall include, but shall not be limited to, the following:

- a. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.
- b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.
- c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.
- d. Description of the Contractor's environmental protection personnel training program.
- e. An erosion and sediment control plan which identifies the type and location of the erosion and sediment controls to be provided. The plan shall include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, Federal, State, and local laws and regulations. A Storm Water Pollution Prevention Plan (SWPPP) may be substituted for this plan.
- f. Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on the site.
- g. Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plan shall include measures to minimize the amount of mud transported onto paved public roads by vehicles or runoff.

h. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.

i. Drawing showing the location of borrow areas.

j. The Spill Control plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. The Spill Control Plan supplements the requirements of EM 385-1-1 and Schriever AFB's Haz Mat Plan. The Hazardous Material Emergency Response Plan may be reviewed at the Environmental Flight office at Schriever AFB. . This plan shall include as a minimum:

1. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Contracting Officer, Schriever AFB's Fire Department, and Schriever AFB's Environmental Flight in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. The plan shall contain a list of the required reporting channels and telephone numbers.

2. The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.

3. Training requirements for Contractor's personnel and methods of accomplishing the training.

4. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

5. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.

6. The methods and procedures to be used for expeditious contaminant cleanup.

k. A non-hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris. The plan shall include schedules for disposal. The Contractor shall identify any subcontractors responsible for the transportation and disposal of solid waste. Licenses or permits shall be submitted for solid waste disposal sites that are not a commercial operating facility. Evidence of the disposal facility's acceptance of the solid waste shall be attached to this plan during the construction. The Contractor shall attach a copy of each of the Non-hazardous Solid Waste Diversion Reports to the disposal plan. The report shall be submitted on the first working day after the first quarter that non-hazardous solid waste has been disposed and/or diverted and shall be for the previous quarter (e.g. the first working day of January, April, July, and October). The report shall indicate the total amount of waste

generated and total amount of waste diverted in cubic meters or tons along with the percent that was diverted.

l. A recycling and solid waste minimization plan with a list of measures to reduce consumption of energy and natural resources. The plan shall detail the Contractor's actions to comply with and to participate in Federal, State, Regional, and local government sponsored recycling programs to reduce the volume of solid waste at the source.

m. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site. If a State of Colorado Fugitive Dust permit or an El Paso County Construction Activity Permit is required, a copy of any plans and/or permits shall be included as an attachment to the plan.

n. A contaminant prevention plan that: identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. In accordance with EM 385-1-1, a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on site at any given time shall be included in the contaminant prevention plan. As new hazardous materials are brought on site or removed from the site, the plan shall be updated. Copies of all correspondence, inventories, notifications, etc. to Schriever AFB's Hazardous Materials Pharmacy, 50 CES/CEV, and the Contracting Officer shall be included with the plan.

o. A waste water management plan that identifies the methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond is required, the plan shall include the design of the pond including drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the waste water, the plan shall include a sketch showing the location for land application along with a description of the pretreatment methods to be implemented. If disposal is to a sanitary sewer, the plan shall include documentation that the Waste Water Treatment Plant Operator has approved the flow rate, volume, and type of discharge.

p. A historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on the project site: and/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be on site or in the area are discovered during construction. The plan shall include methods to assure the protection of known or discovered resources and shall identify lines of communication between Contractor personnel and the Contracting Officer.

q. A pesticide treatment plan shall be included and updated, as information becomes available. The plan shall include: sequence of treatment, dates, times, locations, pesticide trade name, EPA

registration numbers, authorized uses, chemical composition, formulation, original and applied concentration, application rates of active ingredient (i.e. pounds of active ingredient applied), equipment used for application and calibration of equipment. The Contractor is responsible for Federal, State, Regional and Local pest management record keeping and reporting requirements as well as any additional Installation specific requirements. The Contractor shall follow AFI 32-1053 Sections 3.4.13 and 3.4.14 for data required to be reported to the Installation.

1.8.3 Appendix

Copies of all environmental permits, permit application packages, approvals to construct, notifications, certifications, reports, and termination documents shall be attached, as an appendix, to the Environmental Protection Plan.

1.9 PROTECTION FEATURES

This paragraph supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. Prior to start of any on site construction activities, the Contractor and the Contracting Officer shall make a joint condition survey. Immediately following the survey, the Contractor shall prepare a brief report including a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. This survey report shall be signed by both the Contractor and the Contracting Officer upon mutual agreement as to its accuracy and completeness. The Contractor shall protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference which their preservation may cause to the Contractor's work under the contract.

1.10 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the drawings, plans and specifications which may have an environmental impact will be subject to approval by the Contracting Officer and may require an extended review, processing, and approval time. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

1.11 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal

Acquisition Regulation or Federal Law.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 LAND RESOURCES

The Contractor shall confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify any land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. The Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, soil, or other materials displaced into uncleared areas shall be removed by the Contractor.

3.1.1 Work Area Limits

Prior to commencing construction activities, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are not to be disturbed shall be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, any markers shall be visible in the dark. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

3.1.2 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. The Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

3.1.3 Erosion and Sediment Controls

The Contractor shall be responsible for providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's construction activities. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. The Contractor shall construct or install temporary and permanent erosion and sediment control best management practices (BMPs).. BMPs may include, but not be limited to, vegetation cover, silt fences, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins.

3.1.4 Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, stockpile storage, and

temporary buildings shall be placed in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities shall be made only when approved. Erosion and sediment controls shall be provided for on-site borrow and spoil areas to prevent sediment from entering nearby waters. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas.

3.2 WATER RESOURCES

The Contractor shall monitor construction activities to prevent pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation unless otherwise indicated. All water areas affected by construction activities shall be monitored by the Contractor. For construction activities immediately adjacent to impaired surface waters, the Contractor shall be capable of quantifying sediment or pollutant loading to that surface water when required by State or Federally issued Clean Water Act permits.

3.2.1 Wetlands

The Contractor shall not enter, disturb, destroy, or allow discharge of contaminants into any wetlands.

3.3 AIR RESOURCES

Equipment operation, activities, or processes performed by the Contractor shall be in accordance with all Federal and State air emission and performance laws and standards.

3.3.1 Particulates

Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. The Contractor must have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs. The Contractor shall comply with all State and local visibility regulations.

3.3.2 Odors

Odors from construction activities shall be controlled at all times. The odors shall not cause a health hazard and shall be in compliance with State regulations and/or local ordinances.

3.3.3 Sound Intrusions

The Contractor shall keep construction activities under surveillance and

control to minimize environment damage by noise. The Contractor shall comply with the provisions of the State of Colorado's rules.

3.3.4 Burning

Burning shall be prohibited on the Government premises.

3.4 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes shall be as directed below, unless otherwise specified in other sections and/or shown on the drawings.

3.4.1 Solid Wastes

Solid wastes (excluding clearing debris) shall be placed in containers which are emptied on a regular schedule. Handling, storage, and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste will become co-mingled with solid waste. The Contractor shall transport solid waste off Government property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill shall be the minimum acceptable off-site solid waste disposal option. The Contractor shall verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate.

3.4.2 Chemicals and Chemical Wastes

Chemicals shall be dispensed ensuring no spillage to the ground or water. Periodic inspections of dispensing areas to identify leakage and initiate corrective action shall be performed and documented. This documentation will be periodically reviewed by the Government. Chemical waste shall be collected in corrosion resistant, compatible containers. Collection drums shall be monitored and removed to a staging or storage area when contents are within 150 mm of the top. Wastes shall be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations.

3.4.3 Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. Prior to generation of a hazardous waste stream, the Contractor shall be responsible for coordination with Schriever AFB's 50 CES/CEV for specific requirements for management and storage of hazardous waste. Regardless of the Contractor's hazardous waste activity generator status, the Contractor shall be responsible for compliance with Schriever AFB's requirements. The Contractor shall, at a minimum, manage and store hazardous waste in compliance with 40 CFR 262 and shall manage and store hazardous waste in accordance with the Schriever's Haz Mat Plan. The Contractor shall take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. The Contractor shall segregate hazardous waste from other materials and wastes, shall protect it from the weather by placing it in a safe covered location, and shall take precautionary measures such as berming or other appropriate measures against accidental spillage. The Contractor shall be responsible for storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and local laws and regulations. The Contractor shall transport Contractor generated hazardous waste off Government property within 60 days

in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. The Contractor shall dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Spills of hazardous or toxic materials shall be immediately reported to the Contracting Officer and Schriever AFB Environmental Office. Cleanup and cleanup costs due to spills shall be the Contractor's responsibility.

3.4.4 Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spill and evaporation. Fuel, lubricants and oil shall be managed and stored in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations. There shall be no storage of fuel on the project site. Fuel must be brought to the project site each day that work is performed.

3.4.5 Waste Water

Disposal of waste water shall be as specified below.

- a. Waste water from construction activities, such as on site material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, forms, etc. shall not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants. The Contractor shall dispose of the construction related waste water off-Government property in accordance with all Federal, State, Regional and Local laws and regulations or by collecting and placing it in a retention pond where suspended material can be settled out and/or the water can evaporate to separate pollutants from the water. The site for the retention pond shall be coordinated and approved with the Contracting Officer. The residue left in the pond prior to completion of the project shall be removed, tested, and disposed off-Government property in accordance with Federal, State, and local laws and regulations. The area shall be backfilled to the original grade, top-soiled and seeded/sodded.
- b. Water generated from dewatering activities shall be land apply on site in accordance with both the Federal and the State of Colorado laws and regulations for land application.
- c. Water generated from the flushing of lines after disinfection or disinfection in conjunction with hydrostatic testing shall be land applied in accordance with all Federal, State, and local laws and regulations for land application or shall be discharged into the sanitary sewer with prior approval and/or notification to the Waste Water Treatment Plant's Operator.

3.5 RECYCLING AND WASTE MINIMIZATION

The Contractor shall participate in State and local government sponsored recycling programs. The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project. .

3.6 NON-HAZARDOUS SOLID WASTE DIVERSION REPORT

The Contractor shall maintain an inventory of non-hazardous solid waste diversion and disposal of construction and demolition debris. The Contractor shall submit a report to Schriever AFB Environmental Office through the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that non-hazardous solid waste has been generated. The following shall be included in the report:

- a. Construction and Demolition (C&D) Debris Disposed = _____ in cubic meters, as appropriate.
- b. Construction and Demolition (C&D) Debris Recycled = _____ in cubic meters, as appropriate.
- c. Total C&D Debris Generated = _____ in cubic meters, as appropriate.
- d. Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount) = _____ in cubic meters, as appropriate.

3.7 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

If during excavation or other construction activities any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in impact to or the destruction of these resources. The Contractor shall secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

3.8 BIOLOGICAL RESOURCES

The Contractor shall minimize interference with, disturbance to, and damage to fish, wildlife, and plants including their habitat. The Contractor shall be responsible for the protection of threatened and endangered animal and plant species including their habitat in accordance with Federal, State, Regional, and local laws and regulations.

3.9 INTEGRATED PEST MANAGEMENT

In order to minimize impacts to existing fauna and flora, the Contractor, through the Contracting Officer, shall coordinate with the Installation Pest Management Coordinator (IPMC) at the earliest possible time prior to pesticide application. The Contractor shall discuss integrated pest management strategies with the IPMC and receive concurrence from the IPMC through the COR prior to the application of any pesticide associated with these specifications. Installation Pest Management personnel shall be given the opportunity to be present at all meetings concerning treatment measures for pest or disease control and during application of the pesticide. The use and management of pesticides are regulated under 40 CFR

152 - 186.

3.9.1 Pesticide Delivery and Storage

Pesticides shall be delivered to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses. Pesticides shall be stored according to manufacturer's instructions and under lock and key when unattended.

3.9.2 Qualifications

For the application of pesticides, the Contractor shall use the services of a subcontractor whose principal business is pest control. The subcontractor shall be licensed and certified in the state where the work is to be performed.

3.9.3 Pesticide Handling Requirements

The Contractor shall formulate, treat with, and dispose of pesticides and associated containers in accordance with label directions and shall use the clothing and personal protective equipment specified on the labeling for use during all phases of the application. Material Safety Data Sheets (MSDS) shall be available for all pesticide products.

3.9.4 Application

Pesticides shall be applied by a State Certified Pesticide Applicator in accordance with EPA label restrictions and recommendation. The Certified Applicator shall wear clothing and personal protective equipment as specified on the pesticide label. Water used for formulating shall only come from locations designated by the Contracting Officer. The Contractor shall not allow the equipment to overflow. Prior to application of pesticide, all equipment shall be inspected for leaks, clogging, wear, or damage and shall be repaired prior to being used.

3.10 PREVIOUSLY USED EQUIPMENT

The Contractor shall clean all previously used construction equipment prior to bringing it onto the project site. The Contractor shall ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. The Contractor shall consult with the USDA jurisdictional office for additional cleaning requirements.

3.11 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain permanent and temporary pollution control facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

3.12 MILITARY MUNITIONS

In the event the Contractor discovers or uncovers military munitions as defined in 40 CFR 260, the Contractor shall immediately stop work in that area and immediately inform the Contracting Officer.

3.13 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental

protection and pollution control. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor personnel prior to commencing construction activities. Additional meetings shall be conducted for new personnel and when site conditions change. The training and meeting agenda shall include: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitat that are known to be in the area.

3.14 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction in accordance with Contract Clause: "Cleaning Up". The Contractor shall, unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed area shall be graded, filled and the entire area seeded unless otherwise indicated.

-- End of Section --

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03/99

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SECTION 01400

SPECIAL SAFETY REQUIREMENTS

03/99

PART 1 GENERAL

1.1 REFERENCES

the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ENGINEERING MANUALS (EM)

EM 385-1-1 (1996) Safety and Health Requirements Manual

1.2 SUMMARY

This section provides guidelines for preparation of accident prevention plans, and to implement the accident prevention clause (this specification) and EM 385-1-1, Safety and Health Requirements Manual. The U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1 is available from U.S. Government bookstores operated by the Government Printing Office.

U.S. Government bookstores are located in most major cities including Milwaukee, Chicago, Kansas City, Denver, and Pueblo, Colorado.

1.3 PRECONSTRUCTION CONFERENCE

A preconstruction conference will be scheduled prior to beginning of site work at which time representatives of the Contracting Officer will review and discuss requirements relative to planning and administration of the overall safety program.

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-08 Statements

Accident Prevention Plan; G-A

The written site-specific Accident Prevention Plan.

1.5 ACCIDENT PREVENTION PLAN

The Contractor shall submit, prior to the start of on site construction activity, a proposed accident prevention plan which shall be the accident prevention policy to be followed by all of the Contractor's and subcontractor's personnel and supervisory staff during performance of the work.

1.5.1 Requirements

The proposed plan shall be developed after a careful analysis of the work involved and shall be tailored specifically to the conditions of this project. The Contractor's accident prevention plan shall also contain, as a minimum, the following general information or procedures for the activity indicated. The Contractor shall submit his plan for review and acceptance prior to commencing work.

1.5.1.1 Responsible Individual(s)

The Contractor shall designate an onsite employee as the individual responsible for insuring the accident prevention plan is implemented and enforced.

1.5.1.2 Subcontractor Supervision

Explain procedures to assure that subcontractor(s) fully comply with the accident prevention plan.

1.5.1.3 Indoctrination of New Employees

The plan shall include provisions for advising workers of the purpose of the accident prevention plan, specific hazards on the job and precautions to be taken, emergency procedures, information concerning tool box safety meetings, required protective equipment, cleanup rules and location of company safety rules (posting or handout).

1.5.1.4 Tool Box Safety Meetings

Hold weekly "Tool Box" safety meetings. Timely safety subjects shall be determined by a responsible individual. Employees will be informed of time, location, who will conduct, and subject. Identify procedures for including subcontractors. The Contractor shall provide a copy of the Weekly Tool Box Meeting and Monthly Supervisor's Safety Meeting to the Contracting Officer.

1.5.1.5 Fire Prevention and Protection

Identify source of fire protection. Insure adequate fire extinguishers, water barrels, or other fire-fighting equipment is located on site. Explain prevention activities to include storage areas and special hazards such as welding and use of flammable liquids, and other special hazards.

1.5.1.6 Housekeeping

Daily cleanup of all debris and waste materials is required. Adequate disposal containers should be placed strategically around the site. Debris shall be removed on a regular basis. Explain procedures that include use of barrels, dumpsters, trash chutes, etc.

1.5.1.7 Mechanical Equipment Inspection

All mechanical equipment (trucks, cranes, forklifts, backhoes, graders, etc.) shall be inspected prior to use and at fixed intervals throughout the life of the contract. Explain how inspections will be accomplished (frequency, by whom, and records to be kept).

1.5.1.8 First Aid and Medical Facilities

First aid facilities shall be made available on the job site. Arrangements for emergency medical attention shall be made prior to start of work. All emergency numbers (doctor, hospital, ambulance, fire department) shall be posted at the project superintendent's office.

1.5.1.9 Sanitation

Include provisions for toilet facilities, drinking water and washing facilities. A sufficient number of toilet facilities as specified in EM 385-1-1 shall be provided unless permission is granted to use existing facilities (portable chemical are authorized). Insure safe drinking water and individual cups are available. For the projects where corrosive or toxic materials are used, separate washing facilities are required.

1.5.1.10 Safety Promotions

The Contractor shall promote accident prevention. Identify method (posters, awards etc.).

1.5.1.11 Accident Reporting

All accidents (employee injuries, vehicle, building, or equipment damage etc.) regardless of their severity, shall be reported to the onsite government representative or to the area engineer, who in turn will advise the Contractor of forms to be submitted and timeframes.

1.5.1.12 Job Hazard Analysis

When job situations change and it is necessary to alter safety requirements, a Job Hazard Analysis will be accomplished, documented, and added as an addendum to the Accident Prevention Plan. Each Job Hazard Analysis shall include, but not be limited to, a description of the work, probable hazards related to that work and positive precautionary measures to be taken to reduce or eliminate each hazard. An example of changing situations may be new subcontractors performing work such as earth moving, trenching, concrete work, roofing, electrical, masonry etc. The onsite government representative will determine the format and amount of detail required of the written plan.

1.6 EXCAVATION AND TRENCHING

The standards for excavation and trenching are outlined in 29 CFR Part 1926, Subpart P. These standards shall be followed in addition to those outlined in EM 385-1-1.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

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SECTION 01415

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03/97

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SECTION 01415

METRIC MEASUREMENTS

03/97

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 380	(1993) Practice for Use of the International System of Units (SI)
ASTM E 621	(1994) Practice for Use of Metric (SI) Units in Building Design and Construction

1.2 GENERAL

This project includes metric units of measurements. The metric units used are the International System of Units (SI) developed and maintained by the General Conference on Weights and Measures (CGPM); the name International System of Units and the international abbreviation SI were adopted by the 11th CGPM in 1960. A number of circumstances require that both metric SI units and English inch-pound (I-P) units be included in a section of the specifications. When both metric and I-P measurements are included, the section may contain measurements for products that are manufactured to I-P dimensions and then expressed in mathematically converted metric value (soft metric) or, it may contain measurements for products that are manufactured to an industry recognized rounded metric (hard metric) dimensions but are allowed to be substituted by I-P products to comply with the law. Dual measurements are also included to indicate industry and/or Government standards, test values or other controlling factors, such as the code requirements where I-P values are needed for clarity or to trace back to the referenced standards, test values or codes.

1.3 USE OF MEASUREMENTS

Measurements shall be either in SI or I-P units as indicated, except for soft metric measurements or as otherwise authorized. When only SI or I-P measurements are specified for a product, the product shall be procured in the specified units (SI or I-P) unless otherwise authorized by the Contracting Officer. The Contractor shall be responsible for all associated labor and materials when authorized to substitute one system of units for another and for the final assembly and performance of the specified work and/or products.

1.3.1 Hard Metric

A hard metric measurement is indicated by an SI value with no expressed correlation to an I-P value, i.e., where an SI value is not an exact mathematical conversion of an I-P value, such as the use of 100 mm in lieu of 4 inches. Hard metric measurements are often used for field data such as distance from one point to another or distance above the floor.

Products are considered to be hard metric when they are manufactured to metric dimensions or have an industry recognized metric designation.

1.3.2 Soft Metric

- a. A soft metric measurement is indicated by an SI value which is a mathematical conversion of the I-P value shown in parentheses (e.g. 38.1 mm (1-1/2 inches)). Soft metric measurements are used for measurements pertaining to products, test values, and other situations where the I-P units are the standard for manufacture, verification, or other controlling factor. The I-P value shall govern while the metric measurement is provided for information.
- b. A soft metric measurement is also indicated for products that are manufactured in industry designated metric dimensions but are required by law to allow substitute I-P products. These measurements are indicated by a manufacturing hard metric product dimension followed by the substitute I-P equivalent value in parentheses (e.g., 190 x 190 x 390 mm (7-5/8 x 7-5/8 x 15-5/8 inches)).

1.3.3 Neutral

A neutral measurement is indicated by an identifier which has no expressed relation to either an SI or an I-P value (e.g., American Wire Gage (AWG) which indicates thickness but in itself is neither SI nor I-P).

1.4 COORDINATION

Discrepancies, such as mismatches or product unavailability, arising from use of both metric and non-metric measurements and discrepancies between the measurements in the specifications and the measurements in the drawings shall be brought to the attention of the Contracting Officer for resolution.

1.5 RELATIONSHIP TO SUBMITTALS

Submittals for Government approval or for information only shall cover the SI or I-P products actually being furnished for the project. The Contractor shall submit the required drawings and calculations in the same units used in the contract documents describing the product or requirement unless otherwise instructed or approved. The Contractor shall use ASTM E 380 and ASTM E 621 as the basis for establishing metric measurements required to be used in submittals.

-- End of Section --

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SECTION 01451A

CONTRACTOR QUALITY CONTROL
07/01; Omaha Rev. 05/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740	(2001) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329	(2000b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Pricing Schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.

3.2 QUALITY CONTROL PLAN

The Contractor shall furnish for review by the Government, not later than 10 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.1 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.
- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.
- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.
- e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified

deficiencies have been corrected.

- h. Reporting procedures, including proposed reporting formats.
- i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

3.2.2 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.3 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 10 calendar days prior to the Coordination Meeting.

During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure safety and contract compliance. The Safety and Health Manager shall receive direction and authority from the CQC System Manager and shall serve as a member of the CQC staff. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The

Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. The Contractor shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Complete records of all letters, material submittals, show drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer or experienced construction person with a minimum of 5 years in related work. This CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. The CQC System Manager shall be assigned no other duties. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager.

3.4.3 CQC Personnel

A staff shall be maintained under the direction of the CQC system manager to perform all QC activities. The staff must be of sufficient size to ensure adequate QC coverage of all work phases, work shifts, and work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned QC responsibilities and must be allowed sufficient time to carry out these responsibilities. The QC plan will clearly state the duties and responsibilities of each staff member.

3.4.4 Additional Requirement

In addition to the above experience and/or education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors". This course is periodically offered at each of the four area offices in the Omaha District according to the following revolving training schedule:

<u>Badger Area</u>	First Session	Between 15 & 25 April
	Second Session	Between 15 & 25 October
Point of Contact	Roy Brewer	(319) 753-1386
<u>Black Hills Area</u>	First Session	Between 1 & 10 March
	Second Session	Between 1 & 10 September
Point of Contact	Dwight Pochant	(605) 923-2983
<u>Fort Crook Area</u>	First Session	Between 15 & 25 January
	Second Session	Between 15 & 25 July

Point of Contact	Al Kreisler	(402) 293-2540
<u>Rocky Mountain</u>	First Session	Between 1 & 10 June
	Second Session	Between 1 & 10 December
Point of Contact	Paul Jendzejec	(719) 556-4184

The exact date and location for the sessions will be determined approximately 30 days in advance of the training. The cost of training is presently established at \$50 to be paid by each student in advance of the training. For information about a particular session, the best source is the point of contact listed above.

3.4.5 Organizational Changes

The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS AND DELIVERABLES

Submittals, if needed, shall be made as specified in Section 01330 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements. When Section 15950A HEATING, VENTILATING AND AIR CONDITIONING (HVAC) CONTROL SYSTEMS; 15951A DIRECT DIGITAL CONTROL FOR HVAC; 15990A TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS; or 15995A COMMISSIONING OF HVAC SYSTEMS are included in the contract, the submittals required by those sections shall be coordinated with Section 01330 SUBMITTAL PROCEDURES to ensure adequate time is allowed for each type of submittal required.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

- a. A review of each paragraph of applicable specifications, reference codes, and standards. Prior to the preparatory meeting for each definable feature of work, the Contractor shall provide all technical references (i.e. building codes, life safety codes, etc.) referenced in the project specifications for feature(s) of work being addressed at the preparatory meeting. These technical references shall be onsite and available for use by Contractor and Government personnel before the preparatory meeting is held and maintained until the feature(s) of work is/are accepted by the Government.

- b. A review of the contract drawings.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. Review of provisions that have been made to provide required control inspection and testing.
- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
- g. A review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
- j. Discussion of the initial control phase.
- k. The Government shall be notified at least 48 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

- a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
- b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
- d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

- f. The Government shall be notified at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
- g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and comply with testing standards.
- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the

sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed the actual cost for the recheck to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, f.o.b., at the following address:

For delivery by mail: Commander and Director
U.S. Army Engineer Waterways Experiment Station
Attn: CEWES-GS
3909 Hallsferry Road
Vicksburg, Mississippi 39180-6199

For other deliveries: Commander and Director
U.S. Army Engineer Waterways Experiment Station
Attn: CEWES-GS
3909 Hallsferry Road
Vicksburg, Mississippi 39180-6199

Coordination for each specific test, exact delivery location, and dates will be made through the Resident or Area (as directed) Office.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the Special Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.

- c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
- d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.
- e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- f. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
- g. Offsite surveillance activities, including actions taken.
- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- i. Instructions given/received and conflicts in plans and/or specifications.
- j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Contracting Officer's Representative on the first day following the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 SAMPLE FORMS

Sample forms enclosed at the end of this section.

3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages.

by the Contractor.

(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: _____

DATE : _____

Contract No. _____

Project Title & Location:

Weather: _____ Precipitation: _____ in. _____ Temp: _____ Min. _____ Max. _____

1. Contract/Subcontractors and Area of Responsibility:

NUMBER:	TRADE	:	HOURS	:	EMPLOYER	:	LOCATION/DESCRIPTION WORK
1	Electrician	:	40	:	ABC Company	:	Industrial Plant
2	Plumber	:	30	:	XYZ Services	:	Residential
3	Painter	:	20	:	DEF Contractors	:	Commercial Building
4	Roofing	:	15	:	GHI Contractors	:	Warehouse
5	HVAC	:	10	:	JKL Services	:	Office Building
6	Welding	:	25	:	MNO Industries	:	Manufacturing Plant
7	Ironworking	:	35	:	PQR Construction	:	Bridge
8	Construction	:	45	:	STU Builders	:	Highway
9	Construction	:	50	:	VWX Builders	:	Highway
10	Construction	:	55	:	YZA Builders	:	Highway
11	Construction	:	60	:	BCD Builders	:	Highway
12	Construction	:	65	:	EFG Builders	:	Highway
13	Construction	:	70	:	HIJ Builders	:	Highway
14	Construction	:	75	:	KLM Builders	:	Highway
15	Construction	:	80	:	NOP Builders	:	Highway
16	Construction	:	85	:	QRS Builders	:	Highway
17	Construction	:	90	:	TUV Builders	:	Highway
18	Construction	:	95	:	WXY Builders	:	Highway
19	Construction	:	100	:	ZAB Builders	:	Highway
20	Construction	:	105	:	BCD Builders	:	Highway
21	Construction	:	110	:	EFG Builders	:	Highway
22	Construction	:	115	:	HIJ Builders	:	Highway
23	Construction	:	120	:	KLM Builders	:	Highway
24	Construction	:	125	:	NOP Builders	:	Highway
25	Construction	:	130	:	QRS Builders	:	Highway
26	Construction	:	135	:	TUV Builders	:	Highway
27	Construction	:	140	:	WXY Builders	:	Highway
28	Construction	:	145	:	ZAB Builders	:	Highway
29	Construction	:	150	:	BCD Builders	:	Highway
30	Construction	:	155	:	EFG Builders	:	Highway
31	Construction	:	160	:	HIJ Builders	:	Highway
32	Construction	:	165	:	KLM Builders	:	Highway
33	Construction	:	170	:	NOP Builders	:	Highway
34	Construction	:	175	:	QRS Builders	:	Highway
35	Construction	:	180	:	TUV Builders	:	Highway
36	Construction	:	185	:	WXY Builders	:	Highway
37	Construction	:	190	:	ZAB Builders	:	Highway
38	Construction	:	195	:	BCD Builders	:	Highway
39	Construction	:	200	:	EFG Builders	:	Highway
40	Construction	:	205	:	HIJ Builders	:	Highway
41	Construction	:	210	:	KLM Builders	:	Highway
42	Construction	:	215	:	NOP Builders	:	Highway
43	Construction	:	220	:	QRS Builders	:	Highway
44	Construction	:	225	:	TUV Builders	:	Highway
45	Construction	:	230	:	WXY Builders	:	Highway
46	Construction	:	235	:	ZAB Builders	:	Highway
47	Construction	:	240	:	BCD Builders	:	Highway
48	Construction	:	245	:	EFG Builders	:	Highway
49	Construction	:	250	:	HIJ Builders	:	Highway
50	Construction	:	255	:	KLM Builders	:	Highway
51	Construction	:	260	:	NOP Builders	:	Highway
52	Construction	:	265	:	QRS Builders	:	Highway
53	Construction	:	270	:	TUV Builders	:	Highway
54	Construction	:	275	:	WXY Builders	:	Highway
55	Construction	:	280	:	ZAB Builders	:	Highway
56	Construction	:	285	:	BCD Builders	:	Highway
57	Construction	:	290	:	EFG Builders	:	Highway
58	Construction	:	295	:	HIJ Builders	:	Highway
59	Construction	:	300	:	KLM Builders	:	Highway
60	Construction	:	305	:	NOP Builders	:	Highway
61	Construction	:	310	:	QRS Builders	:	Highway
62	Construction	:	315	:	TUV Builders	:	Highway
63	Construction	:	320	:	WXY Builders	:	Highway
64	Construction	:	325	:	ZAB Builders	:	Highway
65	Construction	:	330	:	BCD Builders	:</	

[illegible]

2. Operating Plant or Equipment. (Not hand tools)

[illegible]

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

4. Control Activities Performed:

Preparatory Inspections: (Identify feature of work and attach minutes).

Initial Inspections: (Identify feature of work and attach minutes).

Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

6. Material Received: (Note inspection results and storage provided).

7. Submittals Reviewed:

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

8. Offsite Surveillance Activities, Including Action Taken:

9. Job Safety: (List items checked, results, instructions and corrective actions taken).

10. Remarks: (Instructions received or given. Conflict(s) in Plans and/or specifications. Delays encountered.).

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

CQC System Manager

Date

-- End of Section --

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ATTACHMENT No. 1

FINAL FOUNDATION ANALYSIS

MEDICAL/DENTAL FACILITY SCHRIEVER AIR FORCE BASE, COLORADO

**FINAL FOUNDATION ANALYSIS
MEDICAL/DENTAL FACILITY
SCHRIEVER AIR FORCE BASE, COLORADO**

1. Scope

The results of the foundation investigation and analysis for the Medical/Dental Facility at Schriever Air Force Base, Colorado are presented in this report. The scope of the study was to (1) evaluate the engineering properties of the subsoils; (2) provide allowable soil bearing pressures and (3) recommend types and depths of foundation elements and other measures pertinent to foundation design and construction.

2. Proposed Construction

This project involves the construction of an approximately 1100 square meter (11,840 sq. ft.) single story building to house examination and treatment rooms as well as administrative areas. A 40-stall parking lot is shown for the east side of the site, and an expansion of the building on the south side of the structure is possible. This expansion was taken into consideration during the investigation.

3. Subsurface Investigations

3.1. General

The field investigation for the Medical/Dental Facility was conducted on 23-24 August 2000 by an Omaha District drill crew. The exploratory program consisted of five (5) test borings numbered sequentially from FS00-1 through FS00-5. The borings were advanced with a Gus Pech 1300 truck mounted soil sampling rig using 10.8 cm (4.25-inch) inside diameter (I.D.) hollow stem augers. All borings were drilled to a depth of 6.1 meters (20 feet).

Borings were located and staked in the field by the Corps of Engineers Core Drill Crew. Borings were located by measuring (steel tape) distances from existing structures. Base personnel provided utility clearances with assistance from the Corps of Engineers Field Geologist.

TABLE 1: Summary of Borings

Boring Number	Date Drilled	Total Depth M (ft)	Water During Drilling	Water After Drilling
FS00-1	23 Aug 2000	6.1 (20)	Not Encountered	Not Encountered
FS00-2	23 Aug 2000	6.1 (20)	Not Encountered	Not Encountered
FS00-3	23 Aug 2000	6.1 (20)	Not Encountered	Not Encountered
FS00-4	23 Aug 2000	6.1 (20)	Not Encountered	Not Encountered
FS00-5	23 Aug 2000	6.1 (20)	Not Encountered	Not Encountered

3.2. Standard Penetration Tests

Standard penetration tests were taken in all borings at depth intervals of 76cm (2.5 feet) for the first 3 meters (10 feet) and every 1.5 meters (5 feet)

for the remaining depth of the boring. The standard penetration samples were obtained in accordance with ASTM D 1586-84 "Penetration Test and Split-Barrel Sampling of Soils", using a 63.5kg (140-pound) automatic trip hammer.

3.3. Disturbed Sampling

Representative disturbed samples of the subsoils were taken with a 50.8mm (2.0 - inch) O.D. standard steel split spoon sampler using a 63.5kg (140-pound) automatic SPT hammer, in accordance with ASTM D 1586-84. Samples were collected every 76cm (2.5 feet) for the first 3 meters (10 feet), then every 1.5 meters (5 feet) for the remaining depth of the hole. Samples were placed in a 0.47-liter (1-pint) jar and the lid sealed airtight with at least three wraps of electrical tape. Each jar was labeled, denoting the hole number, sample number, depth of sample, date collected, and the project name. The jars were placed in wooden boxes that were subsequently labeled with the appropriate project information.

3.4. Undisturbed Sampling

Undisturbed samples were attempted using 76.2 mm (3-inch) O.D. Shelby tubes, however due to the granular nature of soils at the target depths, sample recovery and quality was unsatisfactory for testing.

4. Laboratory Testing

Samples were delivered to the Omaha District Quality Assurance Facility for initial identification. Classification testing was performed under contract at the Terracon Incorporated facility in Omaha, NE. Tests were performed to determine visual classification, Atterberg Limits, grain size distribution, natural moisture content, sulfate ion content, soil pH and soil resistivity. All tests were conducted in accordance with EM 1110-2-1906 "Laboratory Soils Testing".

Based upon the results of the testing program, the field logs were revised and supplemented as shown on the boring logs. These final logs represent an interpretation and compilation of the content of the field logs and the results of the laboratory tests of the field samples. The stratification lines shown on the boring logs represent the approximate boundaries between soil types; these transitions may be gradual. Boring logs are available from the Geotechnical Branch, Soils Section A, of the Omaha District.

5. Site Conditions

5.1. General Geology

Schriever Air Force Base is located in the Colorado Piedmont Section of the Great Plains Physiographic Province. This section consists of a late mature-to-old elevated alluvial plain. An original mantle of Pleistocene sand and gravel has been progressively removed by stream erosion so the area consists of mesas topped by sand and gravel bordered by stream valleys. Overburden generally consists of sands, gravels and clays of alluvial origin. Bedrock is commonly the Laramie or Fox Hills Formation(s) of Cretaceous age. Due to the

relatively shallow boring depths attempted during this investigation, it is not known how thick the overburden actually is. However, it was noted from review of a previous foundation investigation (Sept. 1992) for Building X that bedrock was not encountered to a depth of at least 12.2 meters (40 feet) below ground surface. Building X is located near the center of the facility.

5.2. Site-Specific Geology

Surface soils encountered at this site are typical of those found at the installation, comprised mainly of sandy clay and lean clay. Silty sand and sand with silt or clay was found in the middle to lower portions of the borings. The boreholes caved within these granular materials, an indication of low cohesion. The soils encountered should be suitable for use as fill and structural fill, however as is often seen at Schriever the near-surface layers are in a somewhat low density state as evidenced by Standard Penetration Test results.

5.3. Ground Water

Ground water was not encountered within 6.1 meters (20 feet) of the surface during the subsurface investigation. Except for isolated areas of perched water, ground water is not typically found within normal excavation depth at the installation, nor is it anticipated at this site.

5.4. Seismic Evaluation

The state of Colorado has a low to moderate frequency of earthquakes in historic time. In reference to NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Structures (1997), and USACE TI 809-04 Seismic Design for Buildings, (Dec 1998), this site has a short period (0.2-sec) spectral acceleration, S_s , of 0.17g, and a one-second spectral acceleration, S_1 , of 0.057g. In accordance with the criteria, the location has a Site Classification of "D".

6. Subsurface Recommendations

6.1. General

Soils at the project site consist primarily of lean clay, lean clay with sand, and sandy lean clay (CL), with silty sand (SM) and sand with silt (SW-SM, SP-SM) below. High plasticity clay (CH) was not encountered at the site, nor is it anticipated. If high plasticity clay is encountered during excavation, it should not be subsequently used for fill or backfill material. Prior to adding fill to the site, topsoil should be stripped and the subgrade soils scarified and recompacted. A slope of at least 1 percent and preferably 5 percent should be maintained within 3 meters (10 feet) of structures to ensure adequate drainage.

6.2. Foundation Recommendations

6.2.1. Shallow Spread and Continuous Footings

The recommended foundation type for this design is shallow spread and continuous footings bearing on a layer of recompact native soil. Footings should be designed for an allowable excess bearing capacity of 120 kPa (2500 psf). This value represents the maximum allowable bearing pressure at the base of the footings in excess of that due to existing surrounding overburden.

Footings should bear on 1m (3.3 feet) of native soil that has been removed and recompact in 200mm (8-inch) lifts to a density of not less than 95% of maximum Modified density. The over excavation and filling should extend a minimum of 1m (3.3 feet) beyond the outside edge of the footing.

All exterior footings for heated structures should be founded a minimum of 91cm (3.0 feet) below final exterior grade to provide adequate frost protection.

All footings for unheated structures should be founded a minimum of 91 cm (3.0 feet) below final exterior grade to provide adequate frost protection.

6.2. Slabs on Grade

A vapor barrier overlying a 150mm (6-inch) capillary water barrier will be required beneath all floor slabs on grade. A modulus of subgrade reaction "K" of 5.56 kg/cc (200 pci) is recommended for this case (without frost penetration). Slabs on grade may be placed directly on the existing subgrade provided it is not disturbed during construction activities. Disturbed areas should be scarified to a depth of 200mm (8 inches) and compacted to 95% of maximum Modified density.

6.3. Pavement Design

Soils underlying pavement are predominantly lean clay and sandy lean clay (CL). These soils have a frost design classification of F3.

If rigid pavement design does not consider frost penetration, a modulus of subgrade reaction "K" of 4.87 kg/cc (175 pci) is recommended for design purposes. Flexible pavement designs should use a California Bearing Ratio (CBR) value of 8 for subgrades compacted to 95 percent of maximum density per ASTM D 1557-78 when frost is not allowed to penetrate the subgrade. If frost penetration is considered in the design of rigid or flexible pavements, the design shall be in accordance with TM 5-818-2 "Pavement Design for Seasonal Frost Conditions".

6.4. Settlement

Based on Standard Penetration Test results and experience with engineered fills on previous projects, total settlement should not exceed 25mm (1.0-inch) under the recommended loading conditions if the removal and recompaction of soil below footings as described is performed. Differential settlement should not exceed 19mm (0.75-inch) under such conditions.

6.5. Cementing Properties

Sulfate ion content tests were performed on representative samples from footing level of borings FS00-2 and FS00-4.

Test results indicated the sulfate ion content at less than 0.1 percent. Based on criteria outlined in ACI 201.2, a mild exposure condition exists and sulfate-resistant cement will not be required for concrete in contact with soil or groundwater.

Due to the potential for alkali-aggregate reactivity within the boundaries of the Omaha District, cement meeting the optional chemical requirements for low alkali cement on Table 2, ASTM C 150 will also be specified for all concrete. The Resource Conservation Recovery Act (RCRA) mandates, where possible, all concrete specifications will also include the option to use pozzolan as a partial replacement for portland cement.

6.6. Corrosion Potential

Soil resistivity tests were performed on representative samples from borings FS00-2 and FS00-4. Test results indicated a resistivity of 2950 ohm-cm and 3130 ohm-cm, respectively. In accordance with corrosion classifications in the Department of the Army TM 5-811-4 (17 March 1965), "Electrical Design, Corrosion Control", a "moderate" corrosion potential is expected. Soil pH measured 7.9 and 8.3 respectively.

7. Construction Considerations

Relatively few construction-related problems are found at Schriever AFB. Historically the most common is an inability to achieve compaction in some of the granular soils. Since most of the granular soils at this site are located below the over excavation depth, this should not present a difficulty.

CENWO-ED-GA

21 March, 2001

MEMORANDUM FOR CENWO-PM-M (Armstrong)

SUBJECT: Final Foundation Analysis for the Medical/Dental Clinic at Schriever Air Force Base, Colorado

1. Enclosed is the Final Foundation Analysis for the design of the Medical/Dental Clinic project at Schriever Air Force Base, Colorado.

2. Questions regarding this report may be directed to Gordon Lewis, CENWO-ED-GA, (402) 221-4306.

Encl
as

JOHN W. MONZINGO, P.E.
Chief, Geotechnical Engineering
& Sciences Branch

Lewis/ggl/4306

Chytil/CENWO-ED-GH

Ray/CENWO-ED-GA

Monzingo/CENWO-ED-G

CENWO-ED-GA

21 March, 2001

MEMORANDUM FOR CENWO-PM-M (Armstrong)

SUBJECT: Final Foundation Analysis for the Medical/Dental Clinic at Schriever Air Force Base, Colorado

1. Enclosed is the Final Foundation Analysis for the design of the Medical/Dental Clinic project at Schriever Air Force Base, Colorado.

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Encl
as

JOHN W. MONZINGO, P.E.
Chief, Geotechnical Engineering
& Sciences Branch

CF: CENWO-ED-DF

ATTACHMENT No. 2
DESIGN REQUIREMENTS DIAGRAMS

2-1. GENERAL

2.1.1 The design requirements diagrams are contained within Attachment 2 of this RFP.

2.1.2 The design requirements diagrams are to be used in conjunction with the final design drawings and Criteria Sections (01001 – 01008) of the RFP to establish the project scope, quality requirements, and procedural requirements for the design and construction of this project. Diagrams for each room along with room numbers to which each design requirements diagram applies are included in this Attachment.

2-2. DESIGN REQUIREMENTS DIAGRAMS

2.2.1 Information contained on the design requirements diagrams is as follows:

2.2.1.1 Equipment, furniture, and furnishings schedule numbers:

2.2.1.1.1 The design requirements diagrams indicate equipment, furnishings, furniture, etc., using a standard numbering system known as Joint Schedule Numbers (JSN). The JSN consists of an alpha character followed by four or more additional characters.

2.2.1.1.2 The JSN system is explained in detail in the introductory section of MIL-STD-1691 (captured electronically on the CD-ROM and located under the “Specs” Tool Bar for viewing) to which proposers are referred (latest edition). Equipment groupings identified by the first alpha character of the JSN are defined there.

2.2.1.1.3 Logistical responsibility (LR) for equipment items identified using the JSN system is identified in MIL-STD-1691 (latest edition). The logistical responsibility definitions are found in the introductory section of the Standard, and the specific logistical category of each item is found in the Appendix “A” portion of the Standard. In general, items delineated with solid lines on the design requirements diagrams are LR “A” (Contractor-furnished and installed), and with dashed lines are LR “C” (Government furnished and installed). Where there is a conflict between the drawings and MIL-STD-1691, the MIL-STD-1691 governs.

2.2.1.1.4 Definition of equipment items. Definitions of equipment items and an indication of their utility support requirements are found in Appendix A of the MIL-STD-1691 (latest edition).

2.2.1.1.5 Electrical and communications device requirements. Electrical and communications device requirements are indicated on the design requirements diagrams. A legend defining the symbols used is included following the Design Requirements Diagrams.

Medical/Dental Clinic
Schriever AFB, Colorado

2.2.1.1.6 Equipment items shall conform to MIL-STD-1691 (latest edition) according to the JSN listed in the Standard.

2.2.1.1.7 New equipment shall be provided complete with all necessary accessories and other components to make them fully functional.

2.2.1.1.8 The Contractor shall coordinate the design placement, utility requirements and structural support for all equipment, including Government furnished items. Particular care shall be exercised in this regard for modular laboratory, pharmacy, and administrative casework.

2.2.1.1.9 At the end of the Design Requirements Diagrams, a legend for electrical devices is provided. Also, catalog cut sheets for any items not included in MIL-STD-1691 are provided at the end of this Section along with their JSN listings below:

EQUIPMENT SHEETS	JSN
SS Grab Bar	A5109
SS Grab Bar	A5112
Slimline TV Wall Mounts	A5212 & A5220
Movable Modular Casework	E1130
Audio Metric Test Booth	MOO50T
Pharmacist Smart Cabinet	M7262
G7781 Dental Thermal Disinfectant	S4700, S4710 & S4720
E Series Automatic Autoclave	S5000T
Distillation	S8300

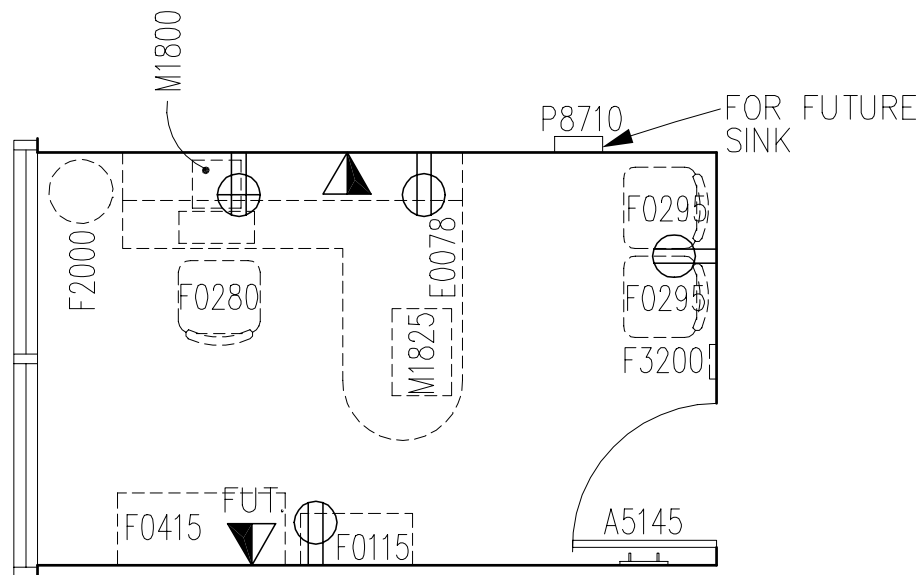
DESIGN REQUIREMENTS DIAGRAM INDEX

NAME/DESCRIPTION OF AREA	ROOM NUMBER(S)	PAGE NO.	1191 ROOM CODE
Typical Family Practice Admin. Office	014	2-4	— OFAO1
Audiobooth	017	2-5	— PEHS1
BEE / PH Office	012	2-6	— OFAO1
General Storage Hk/Supply Stor. Biomedical Work Station	023, 023A, 023B	2-7	— BMCW1
Central Issue	052	2-8	— SRS02
Clean Utility	041	2-9	— UCCL1
Conference/Training	025	2-10	— CRAO1
General D.T.R.	045, 047, 049, 051, 053	2-11	— DNTG1
Dental Admin.	050	2-12	— OFAO2
Dental Reception/Records and Dental Waiting	042, 043	2-13	— RECP1/PARS1/WRCO1
Dental X-Ray, Developing Professional Wk. Area	044, 044A, 046, 048	2-14	— DNXP1/DNXP2/DNUA1
D.I.P.C.	054	2-15	— DNSC1
Ecg/Pulmonary Room	015	2-16	— OPEC1
Eye Exam	016	2-17	— EYEL1
Exam Room	030, 032, 034, 036, 038, 040	2-18	— EXRG1
Family Practice Reception	009	2-19	— RECP1
Family Practice Waiting	006	2-20	— WRCO1
Typical Female Public Toilet	004	2-21	— TLTF1
Typical Janitor's Closet	056	2-22	— JANC1
Lounge	019	2-23	— SLOO1
Typical Male Public Toilet	003	2-24	— TLTM1
Storage/Medical Records Hot Desk/Copier/Dist.	035, 037	2-25	— PARS1
Typical OIC Office	018	2-26	— OFAO1
Satellite Pharmacy	007	2-27	— PHOD2
Pharmacy Waiting	005	2-28	— WRCO1
Provider Cubicles	024	2-29	— OPDO1
Soiled Utility/Trash	031	2-30	— USCL1
Blood Draw Specimen Toilet Spec./Stat. Lab	011, 011A, 013	2-31	— LBVP2/TLTS1/LBOB1
Typical Male and Female Staff Toilet/Shower and Lockers	026, 026A, 027, 027A	2-32	— TLTF1/TLTM1/SHRO1/LROO2
Treatment Room	033	2-33	— TRGM1
Weight Measure/Screening	039	2-34	— PENM4
X-Ray Room, X-Ray QC/DEV	008, 010	2-35	— XDR02/XFSA1
Communications Legend		2-36, 2-37	
Electrical Legend		2-38	

Design Requirements Diagram

Typical Family Practice
Admin. Office

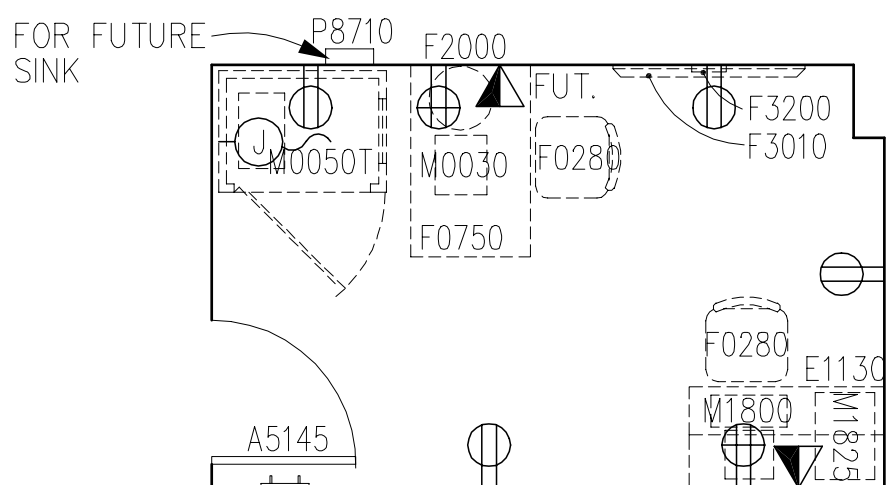
Applicable Room No.'s: 014



Design Requirements Diagram

Audiobooth

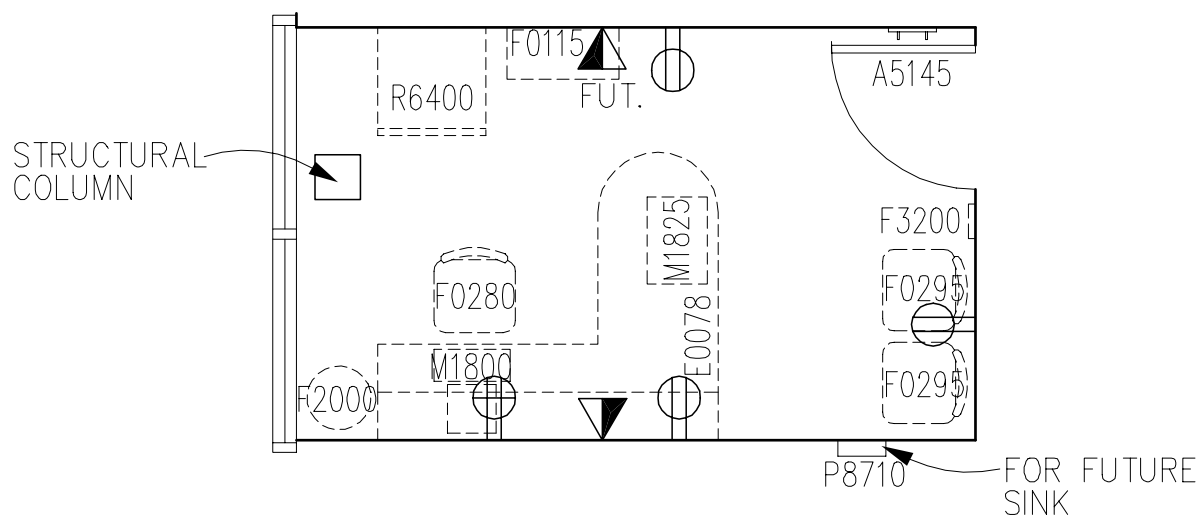
Applicable Room No.'s: 017



Design Requirements Diagram

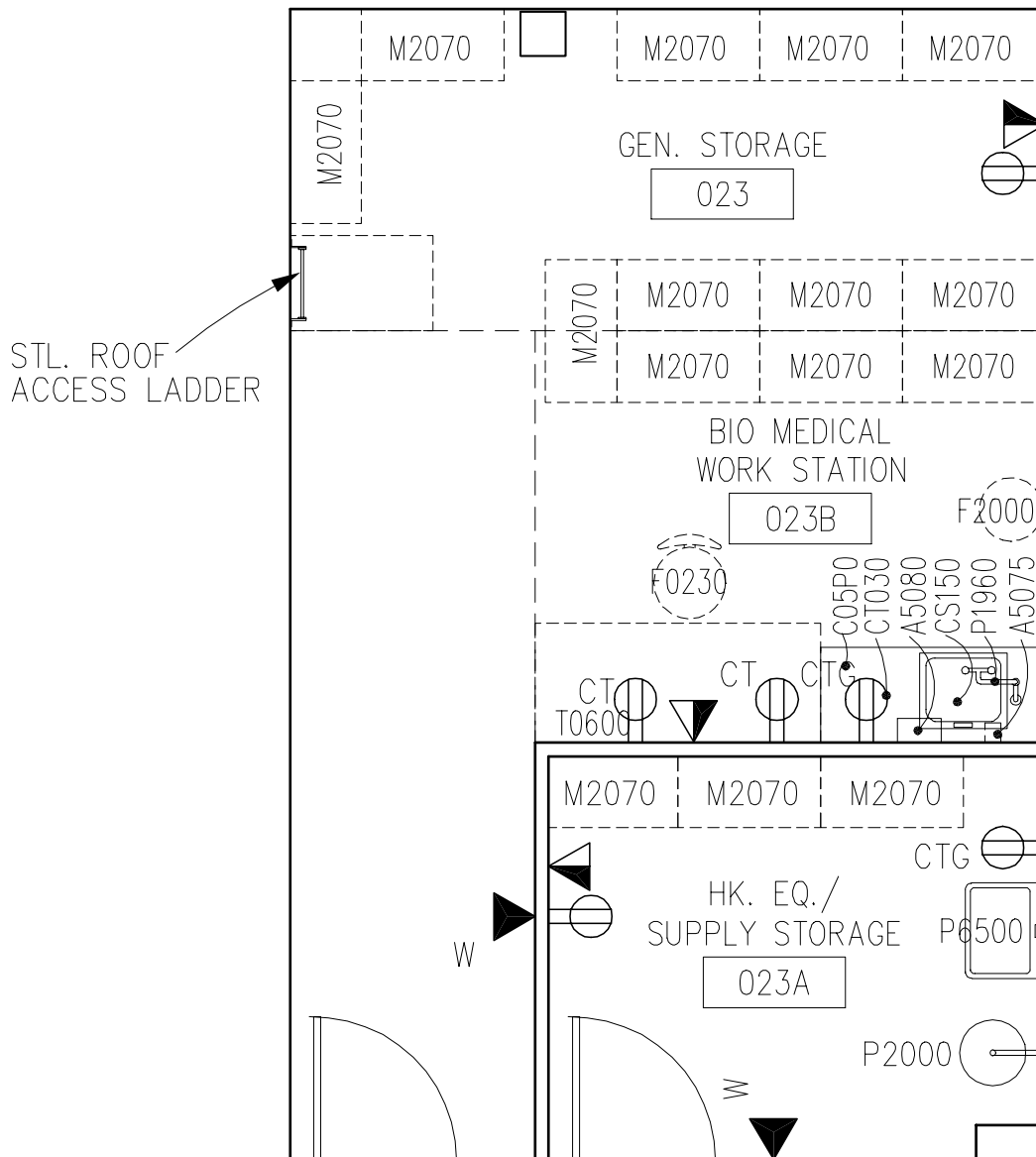
BEE / PH Office

Applicable Room No.'s: 012



General Storage Hk./Supply Stor. Design Requirements Diagram Biomedical Work Station

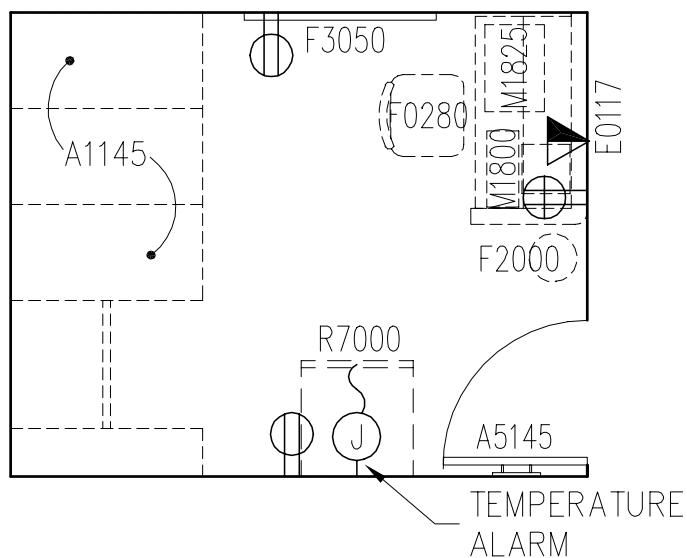
Applicable Room No.'s: 023, 023A, 023B



Design Requirements Diagram

Central Issue

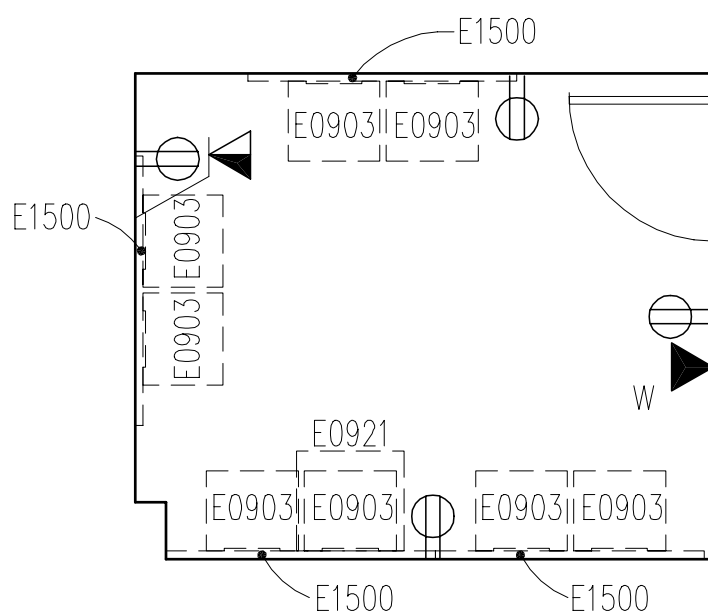
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Design Requirements Diagram

Clean Utility

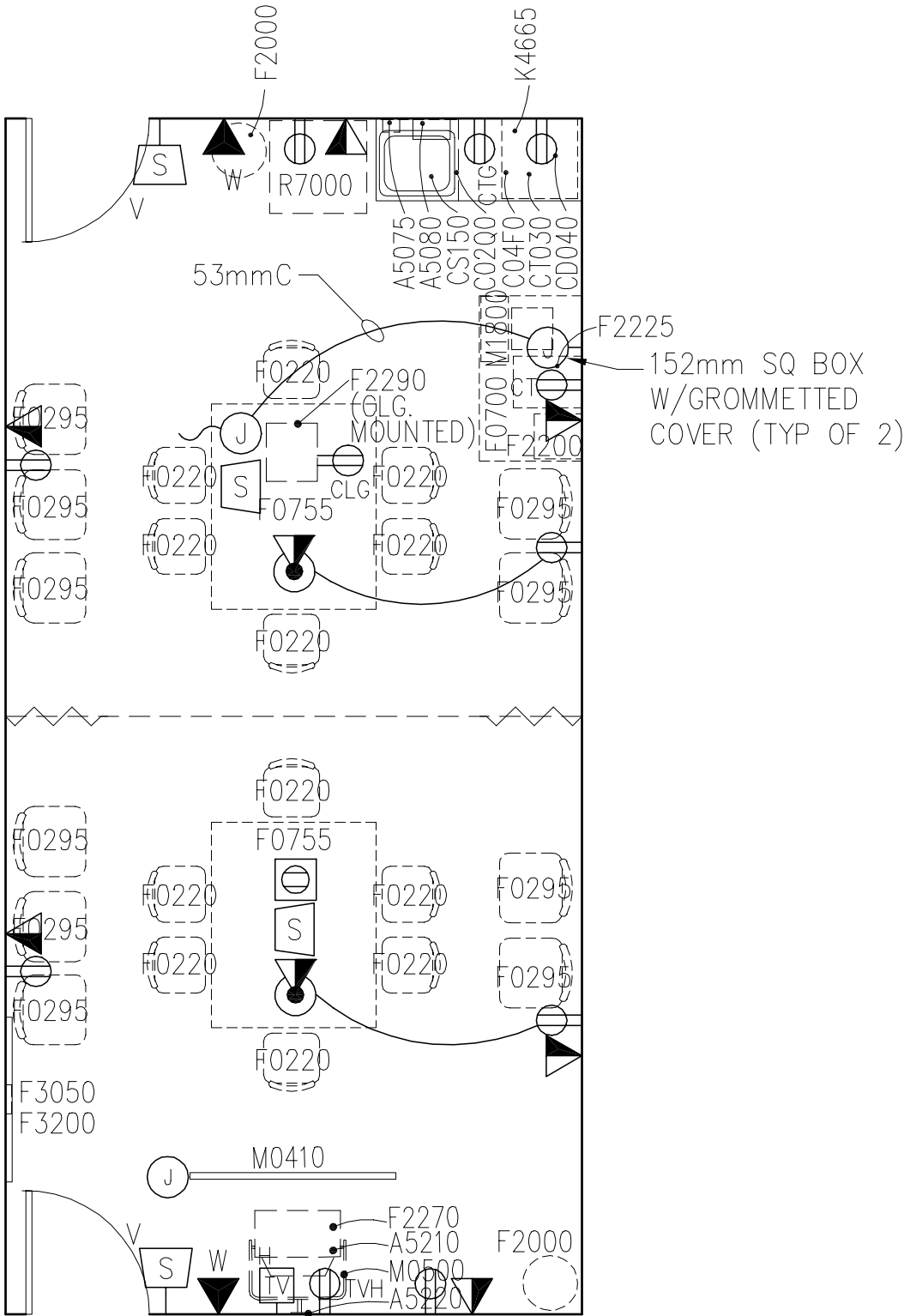
Applicable Room No.'s: 041



Design Requirements Diagram

Conference/Training

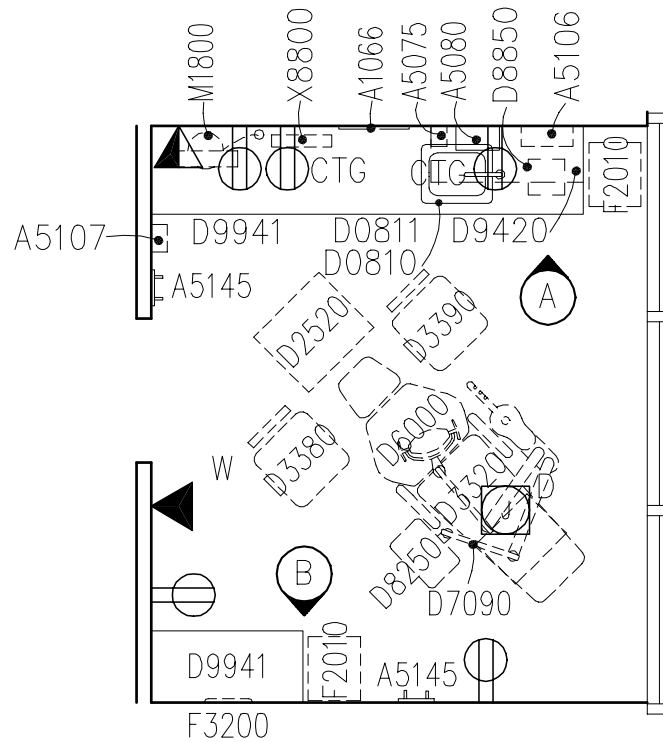
Applicable Room No.'s: 025



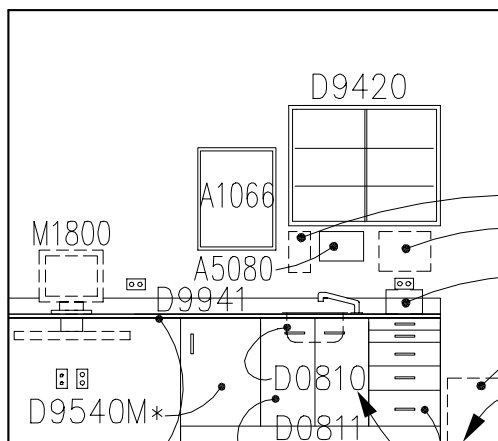
Design Requirements Diagram

General D.T.R.

Applicable Room No.'s: 045, 047, 049, 051, 053

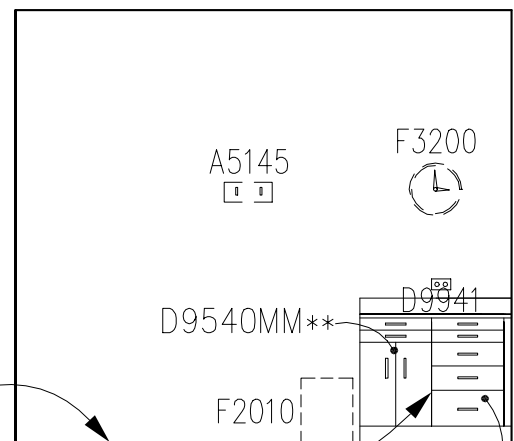


PLAN



COOR. CT HEIGHT
WITH GOVERNMENT

ELEVATION



CONTRACTOR FURNISHED
DENTAL CABINETRY

ELEVATION



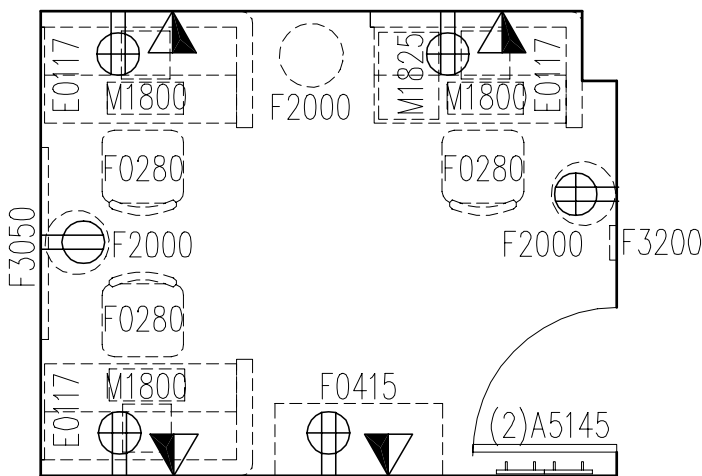
* HEIGHT MODIFIED FROM MIL-STD 1691

** HEIGHT & DOOR/DWR CONFIG. MODIFIED FROM MIL-STD 1691

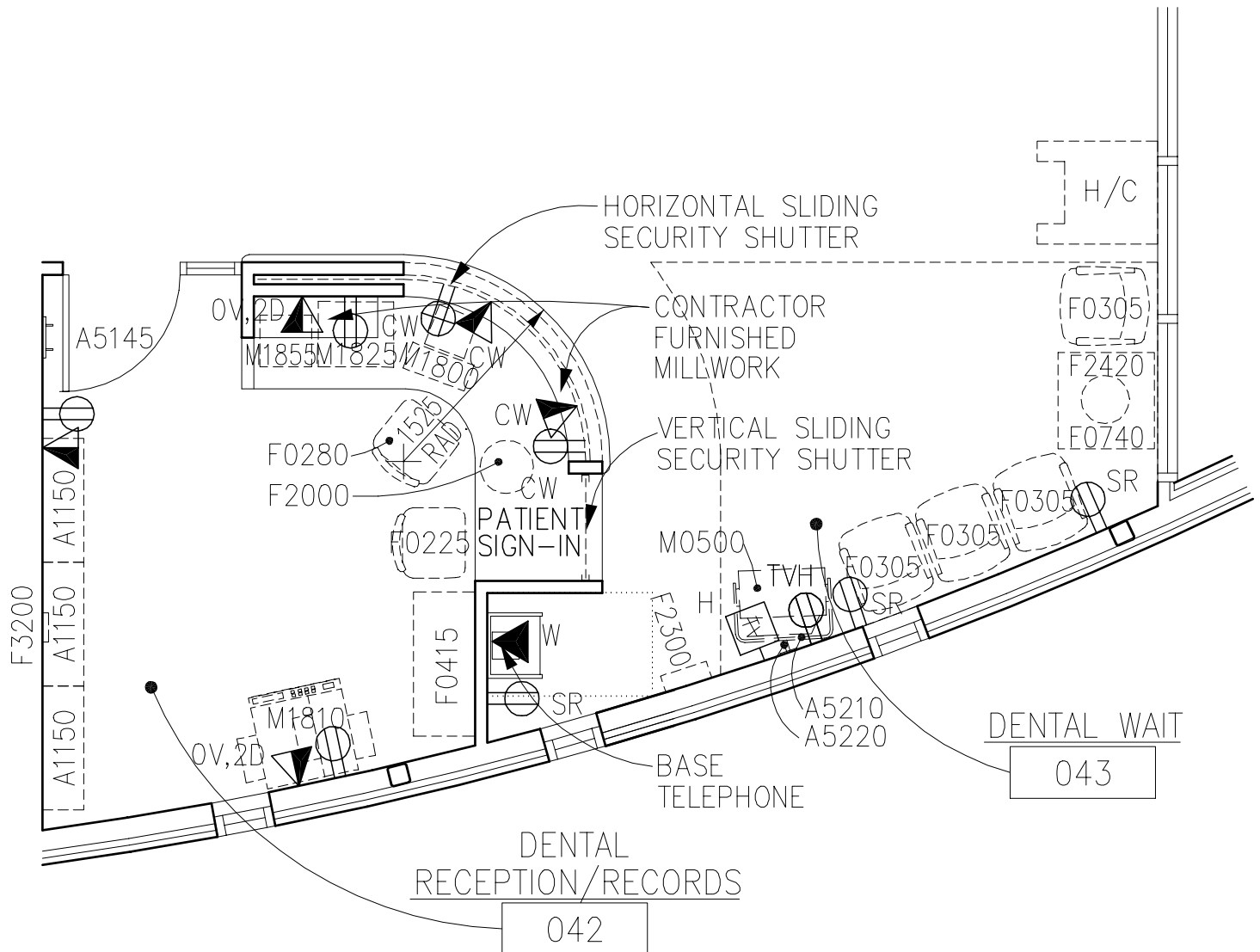
Design Requirements Diagram

Dental Admin.

Applicable Room No.'s: 050



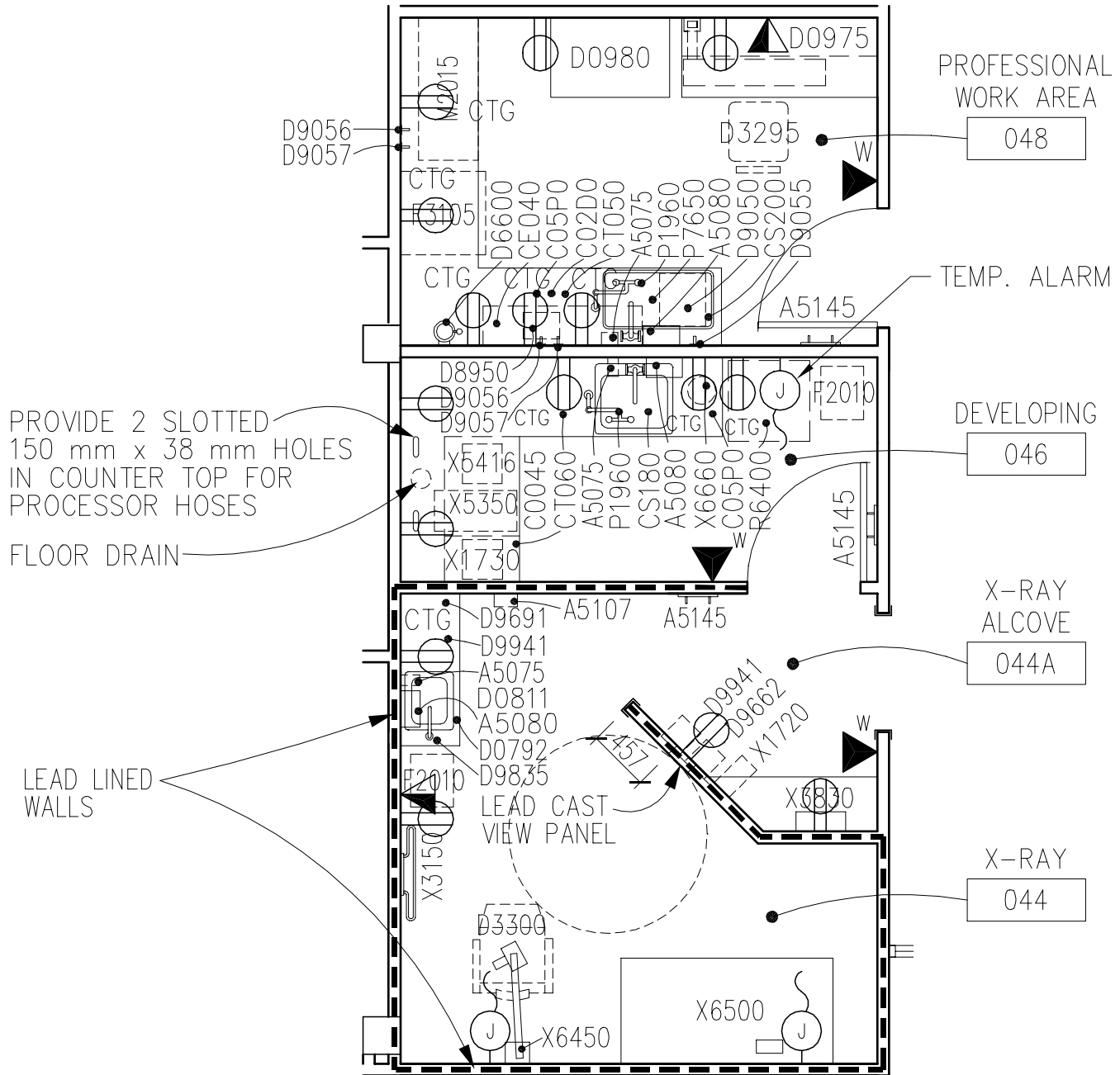
Applicable Room No.'s: 042 & 043



Design Requirements Diagram

Professional Wk. Area

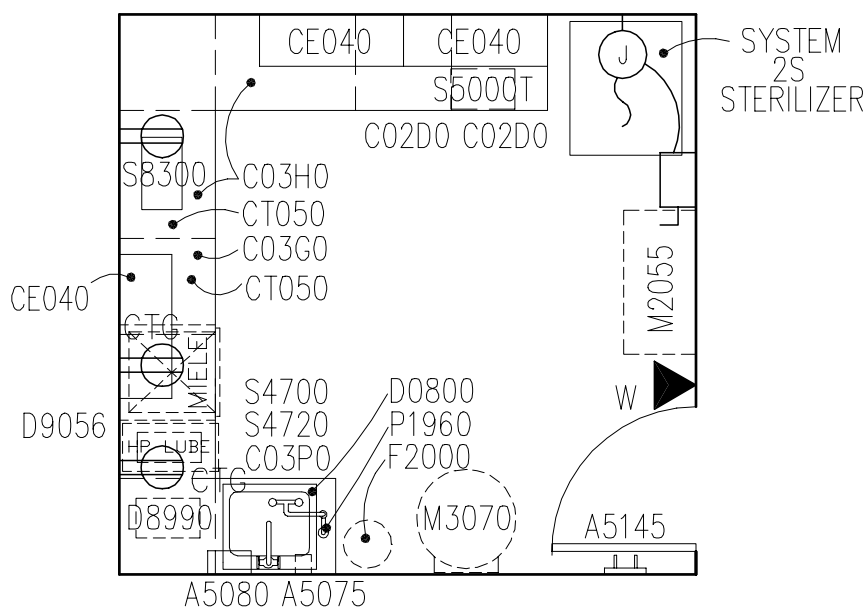
Applicable Room No.'s: 044, 044A, 046, 048



Design Requirements Diagram

D.I.P.C.

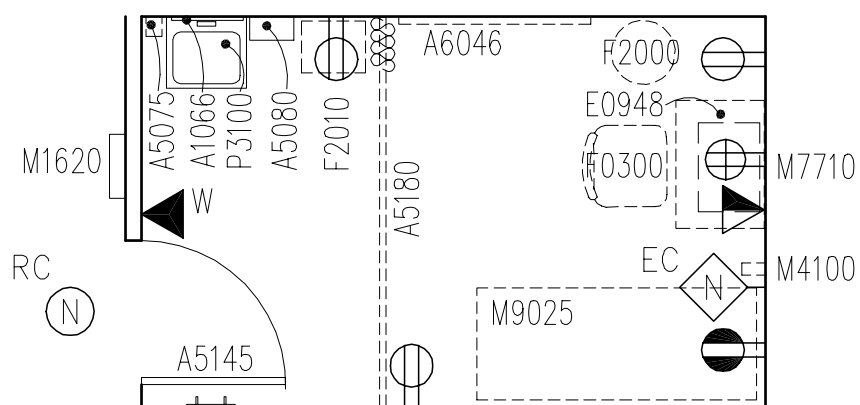
Applicable Room No.'s: 054



Design Requirements Diagram

Ecg/Pulmonary Room

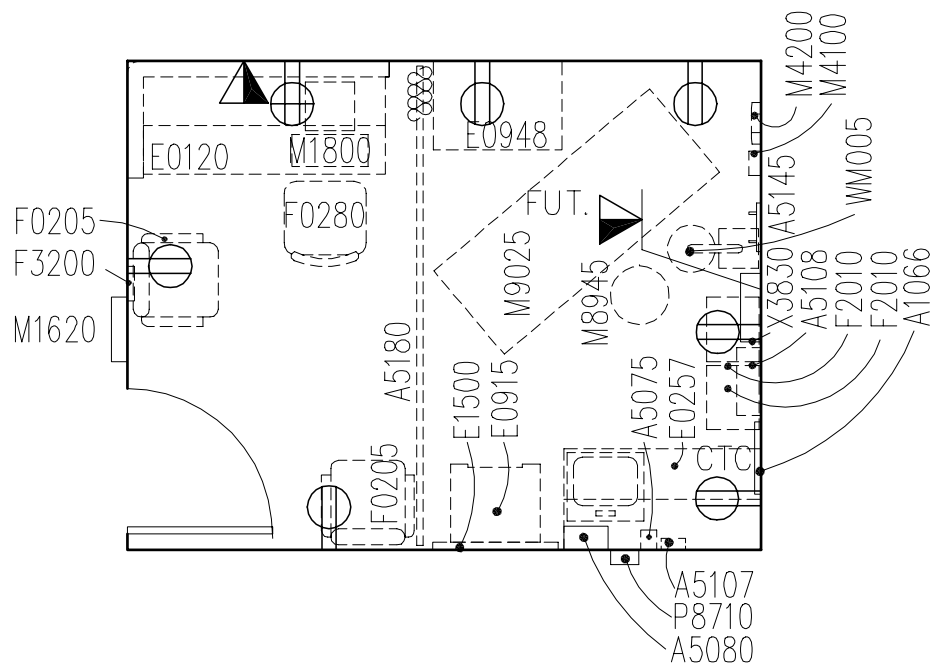
Applicable Room No.'s: 015



Design Requirements Diagram

Exam Room

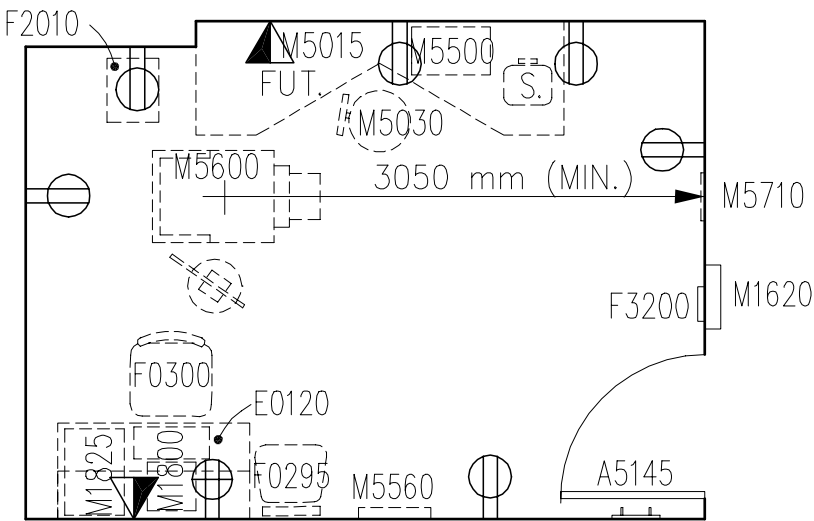
Applicable Room No.'s: 030, 032, 034, 036, 038, 040



Design Requirements Diagram

Eye Exam

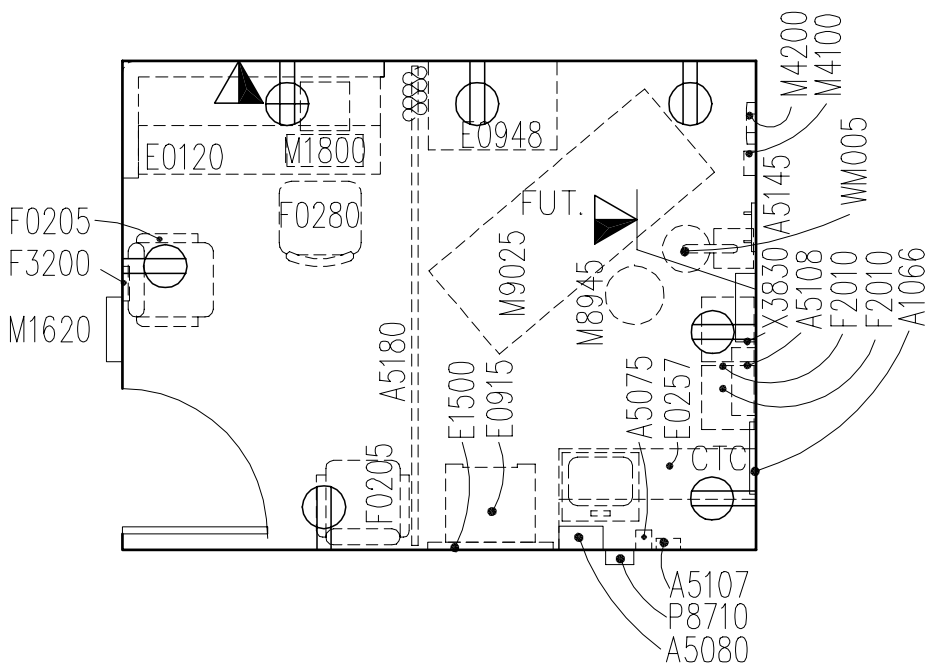
Applicable Room No.'s: 016



Design Requirements Diagram

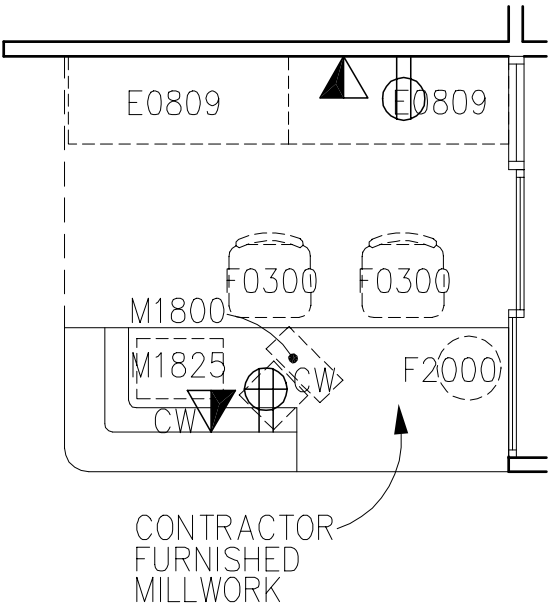
Exam Room

Applicable Room No.'s: 030, 032, 034, 036, 038, 040



Design Requirements Diagram

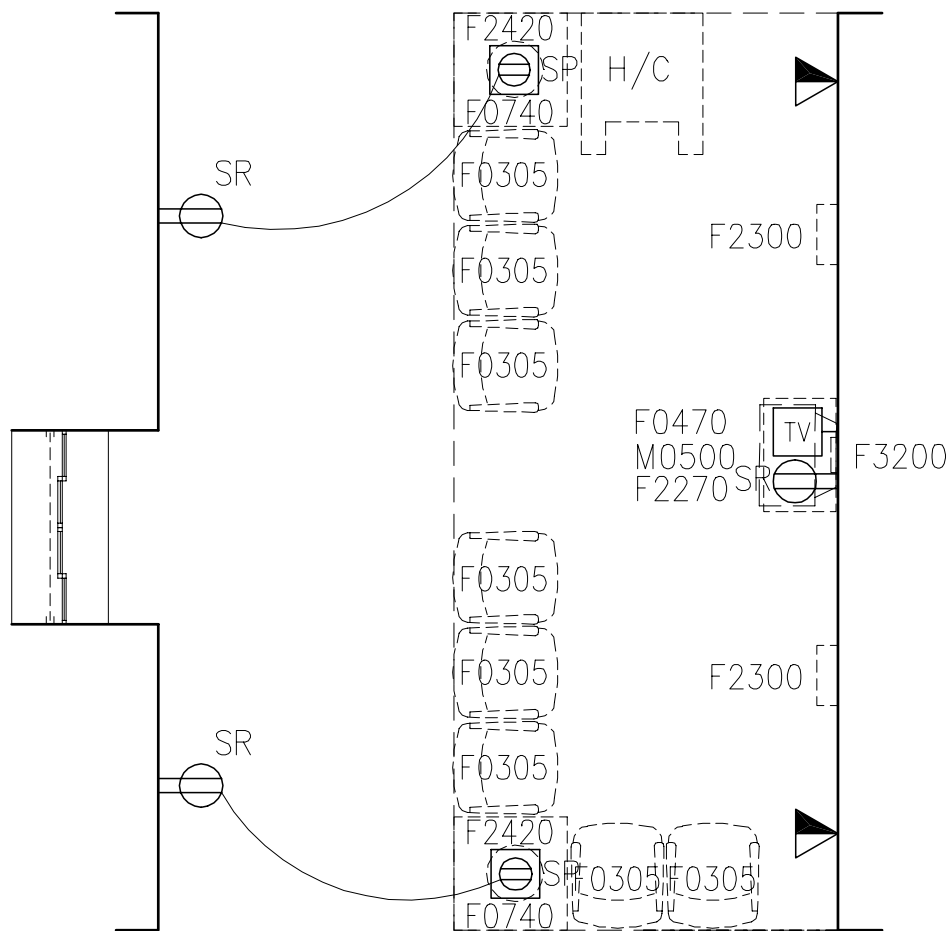
Applicable Room No.'s: 009



Design Requirements Diagram

Family Practice
Waiting

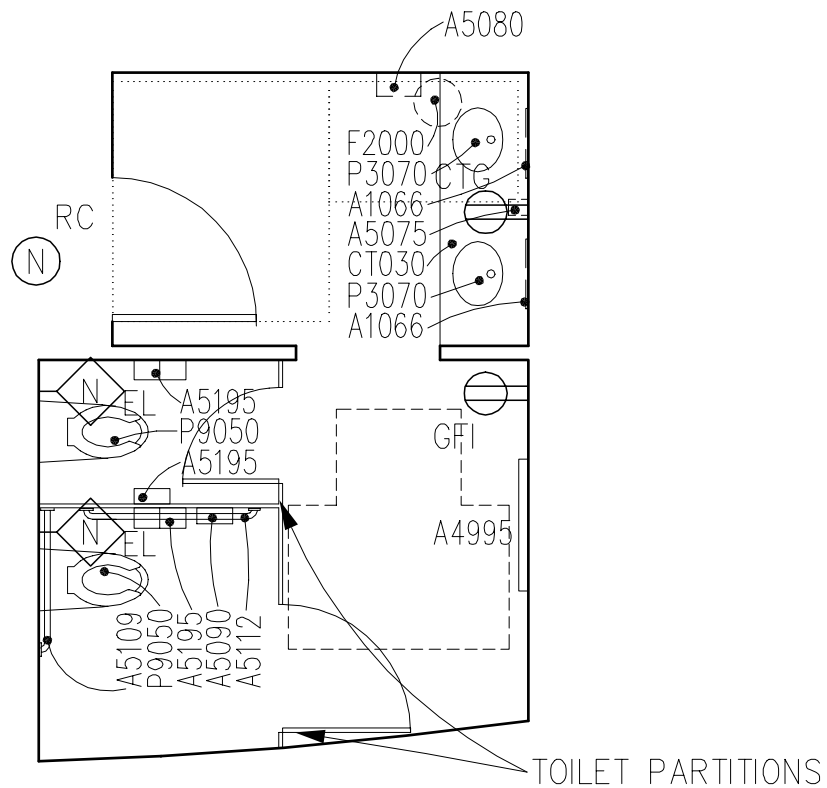
Applicable Room No.'s: 006



Design Requirements Diagram

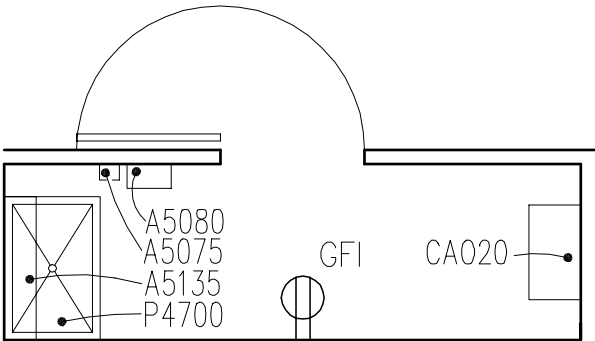
Typical Female Public Toilet

Applicable Room No.'s: 004



Design Requirements Diagram

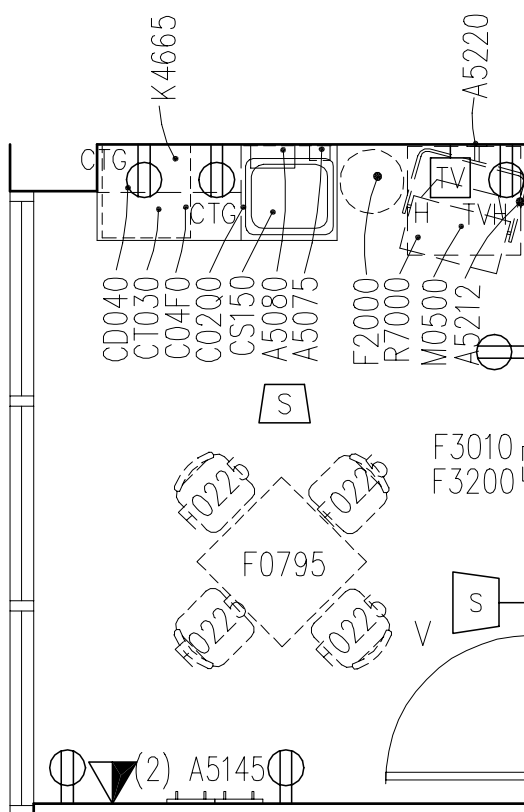
Applicable Room No.'s: 056



Design Requirements Diagram

Lounge

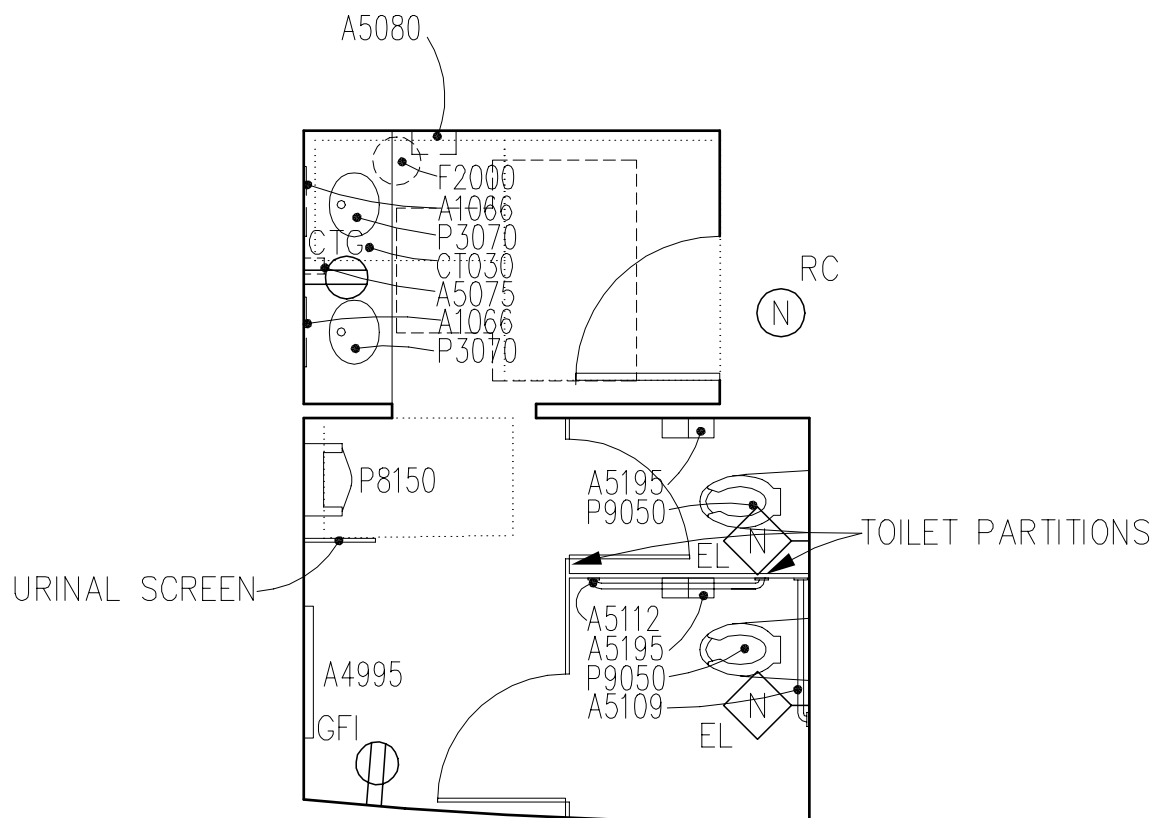
Applicable Room No.'s: 019



Design Requirements Diagram

Typical Male Public Toilet

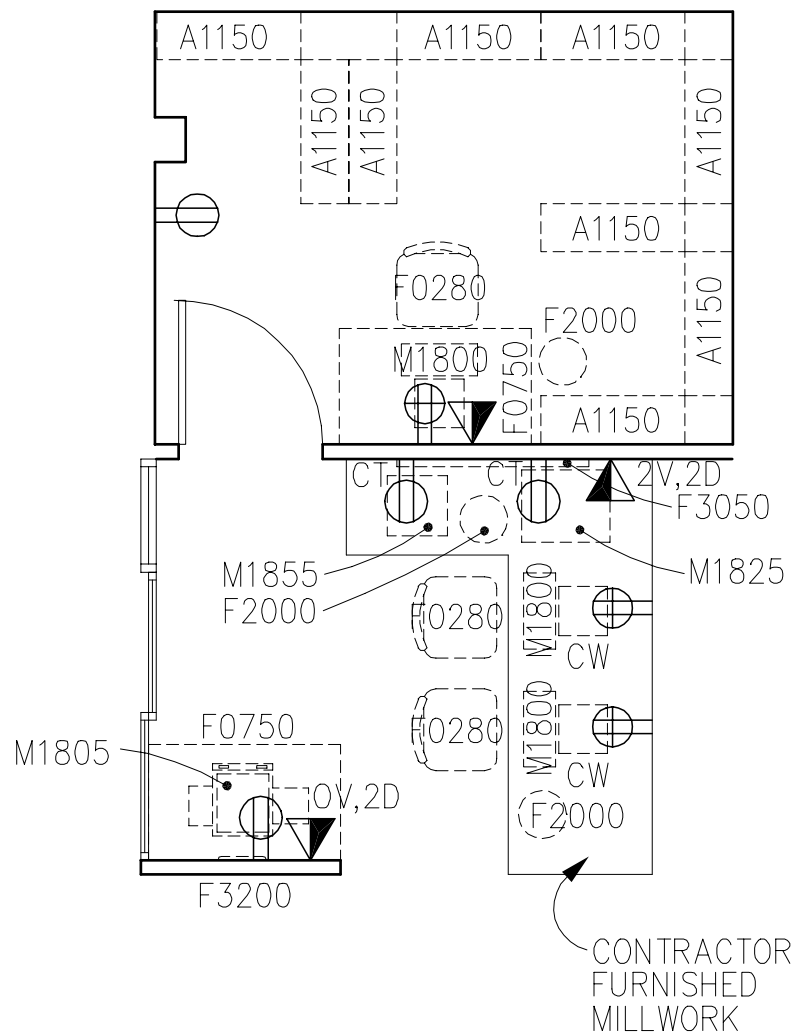
Applicable Room No.'s: 003



Storage/Medical Records Design Requirements Diagram

Hot Desk/Copier/Dist.

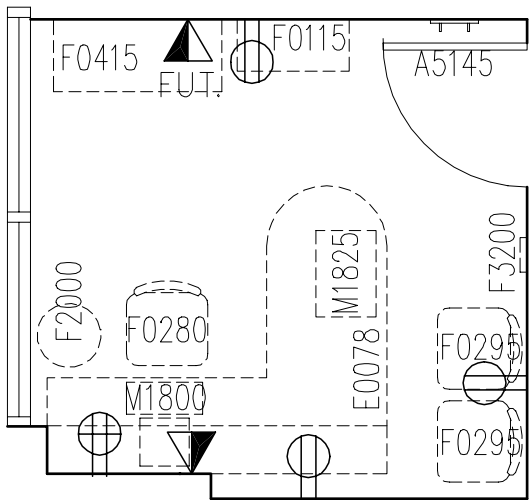
Applicable Room No.'s: 035, 037



Design Requirements Diagram

Typical OIC Office

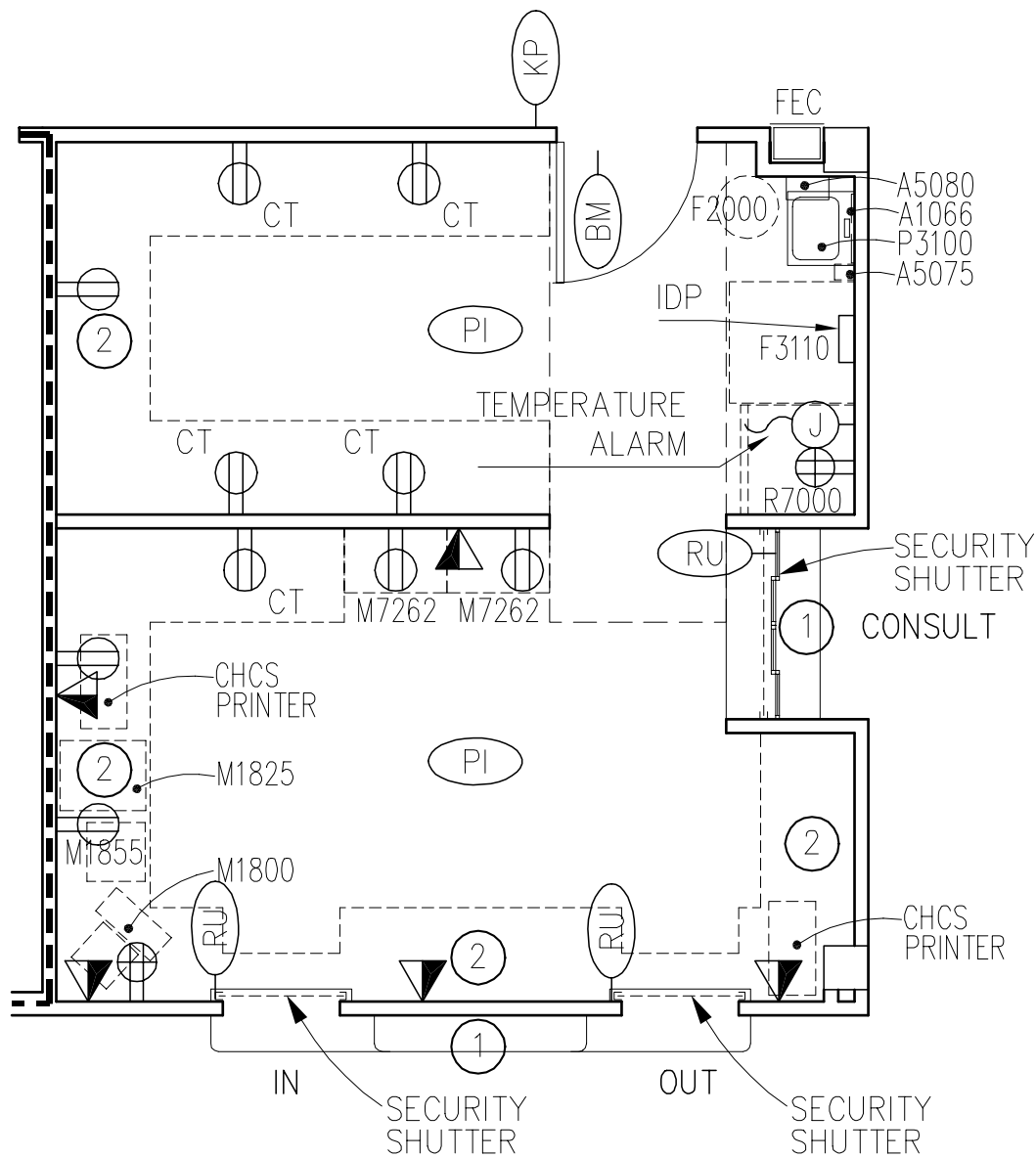
Applicable Room No.'s: 018



Design Requirements Diagram

Satellite Pharmacy

Applicable Room No.'s: 007

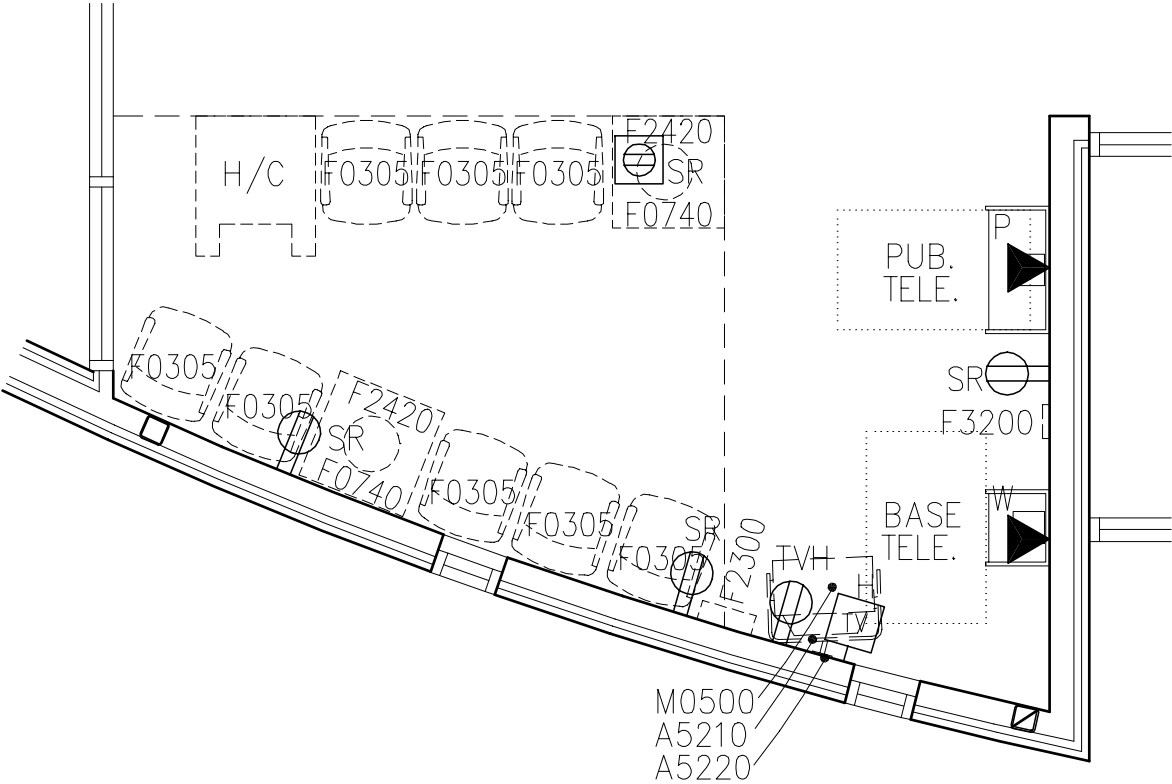


- ① CONTRACTOR FURNISHED MILLWORK
- ② GOVERNMENT FURNISHED MODULAR PHARMACY CABINETRY

Design Requirements Diagram

Pharmacy Waiting

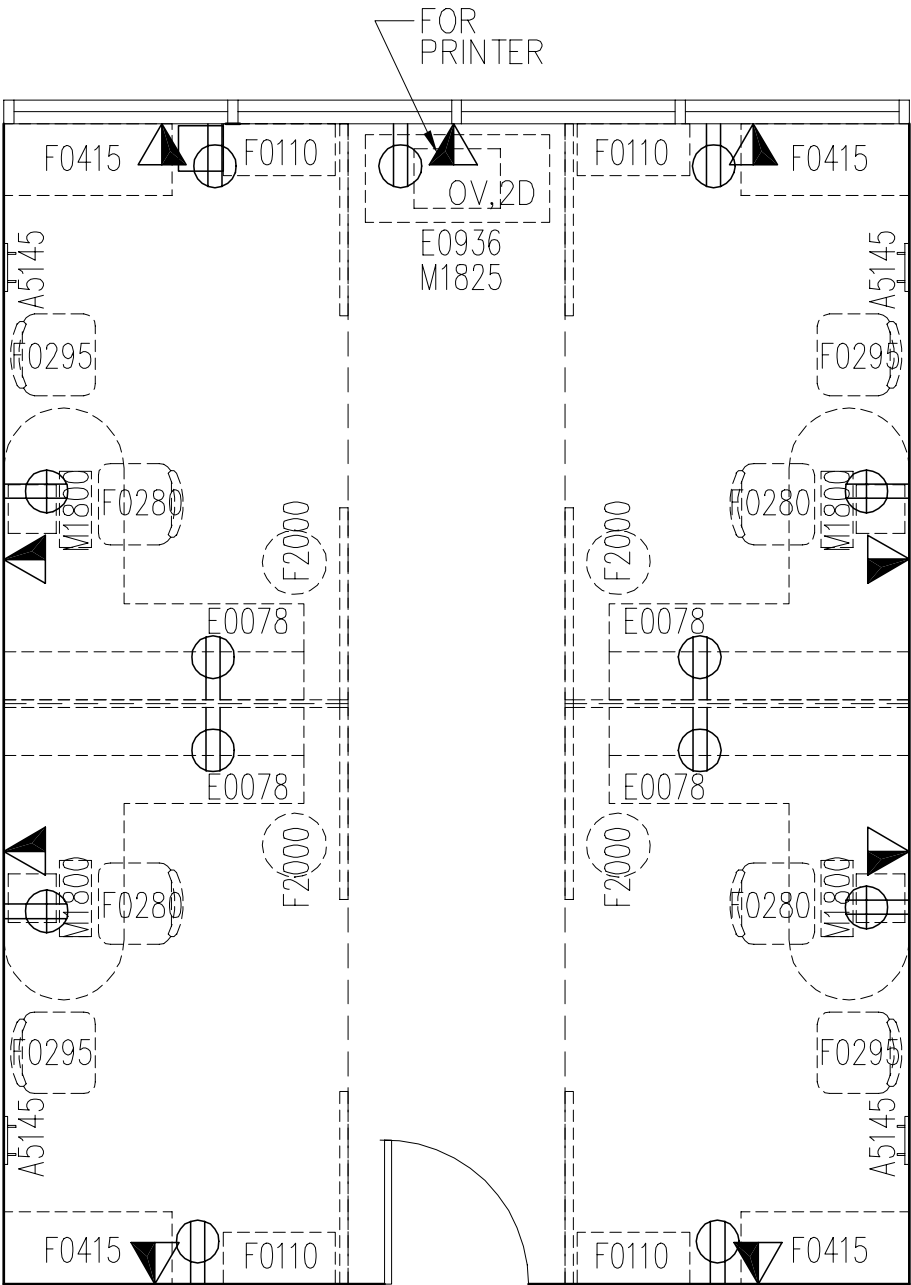
Applicable Room No.'s: 005



Design Requirements Diagram

Provider Cubicles

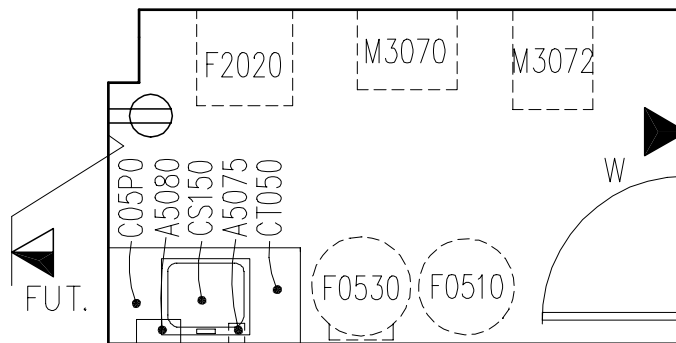
Applicable Room No.'s: 024



Design Requirements Diagram

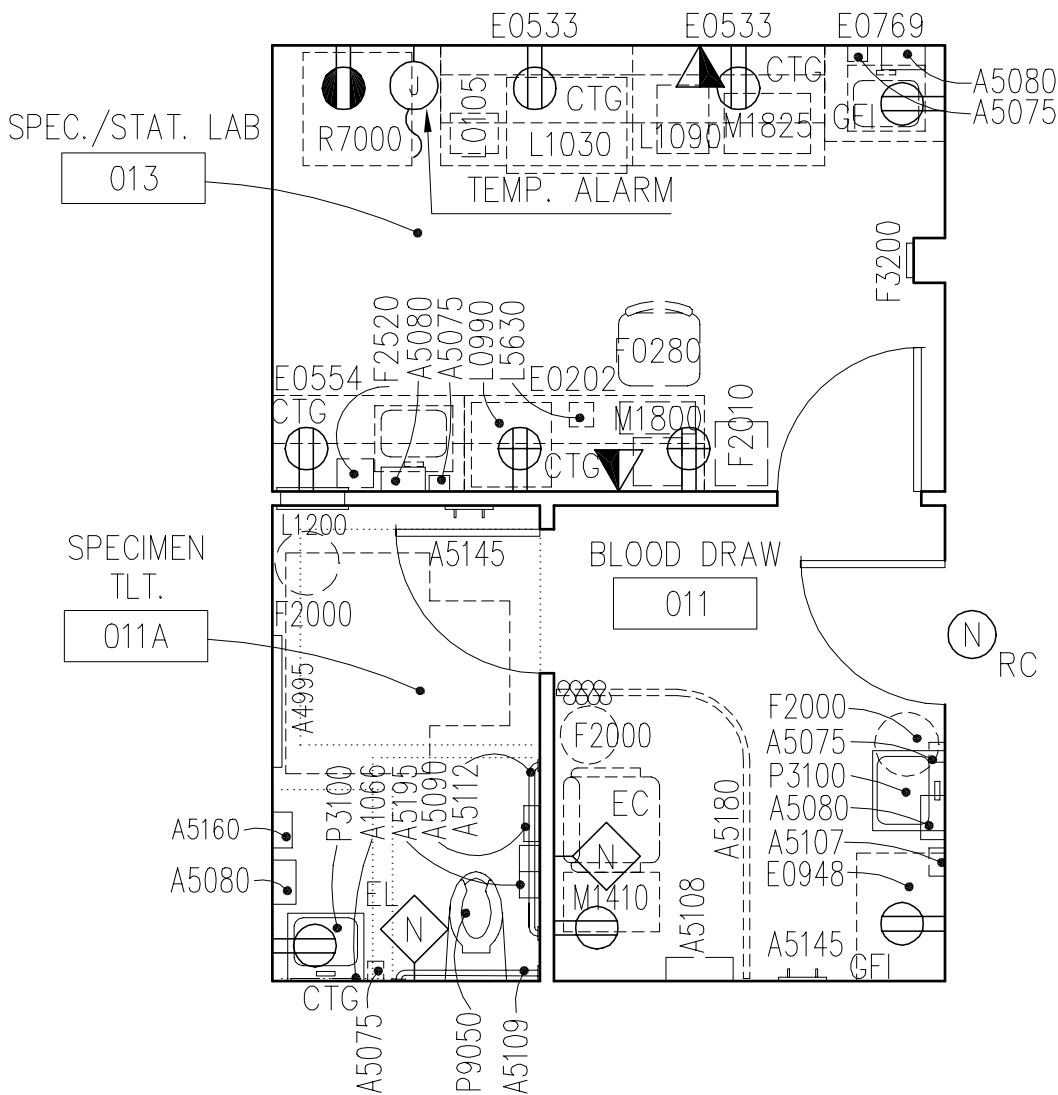
Soiled Utility/Trash

Applicable Room No.'s: 031



Design Requirements Diagram

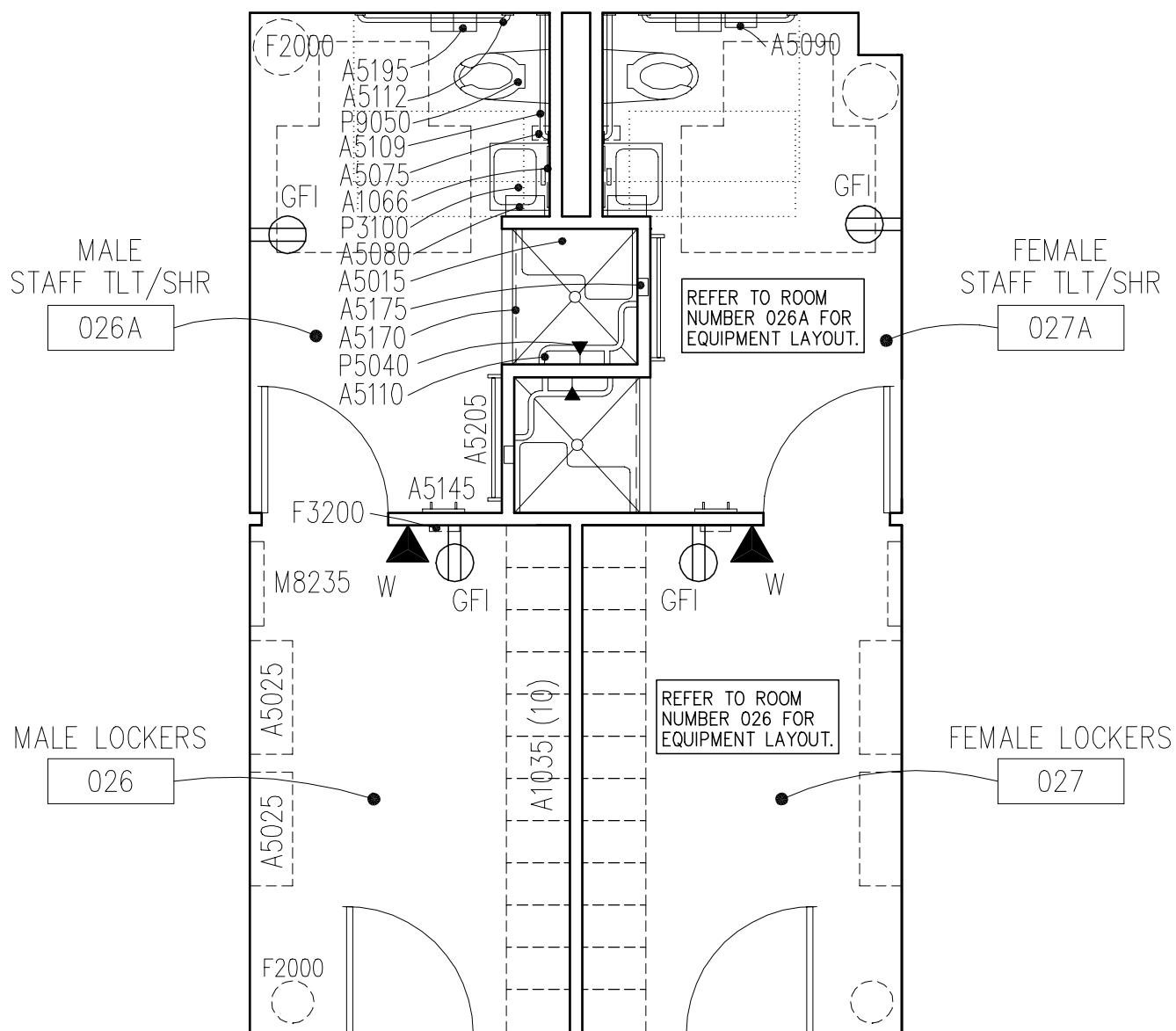
Applicable Room No.'s: 011, 011A, 013



Design Requirements Diagram

Typical Male & Female Staff Toilet / Shower & Lockers

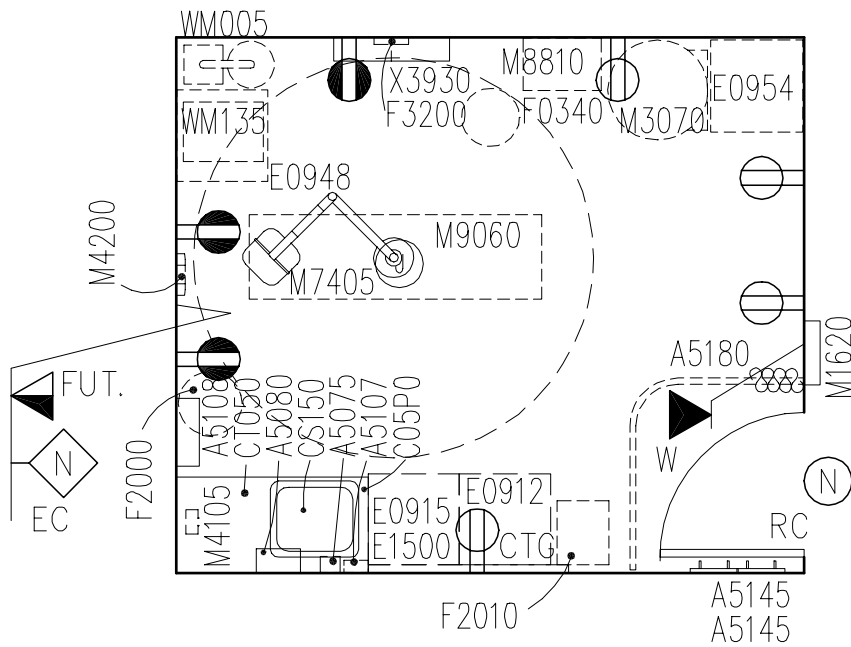
Applicable Room No.'s: 026, 026A, 027, 027A



Design Requirements Diagram

Treatment Room

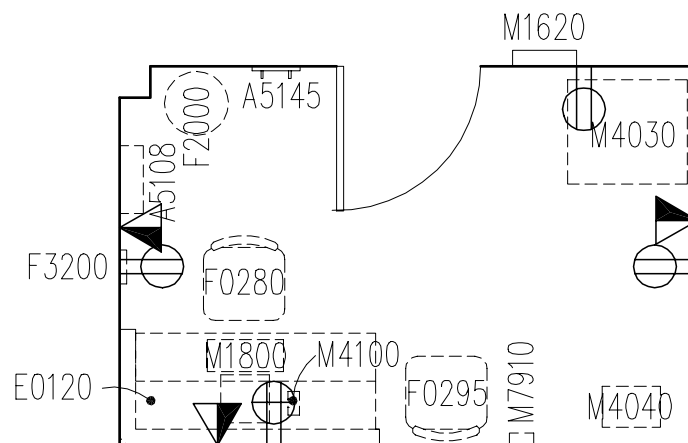
Applicable Room No.'s: 033



Design Requirements Diagram

Weight Measure/
Screening

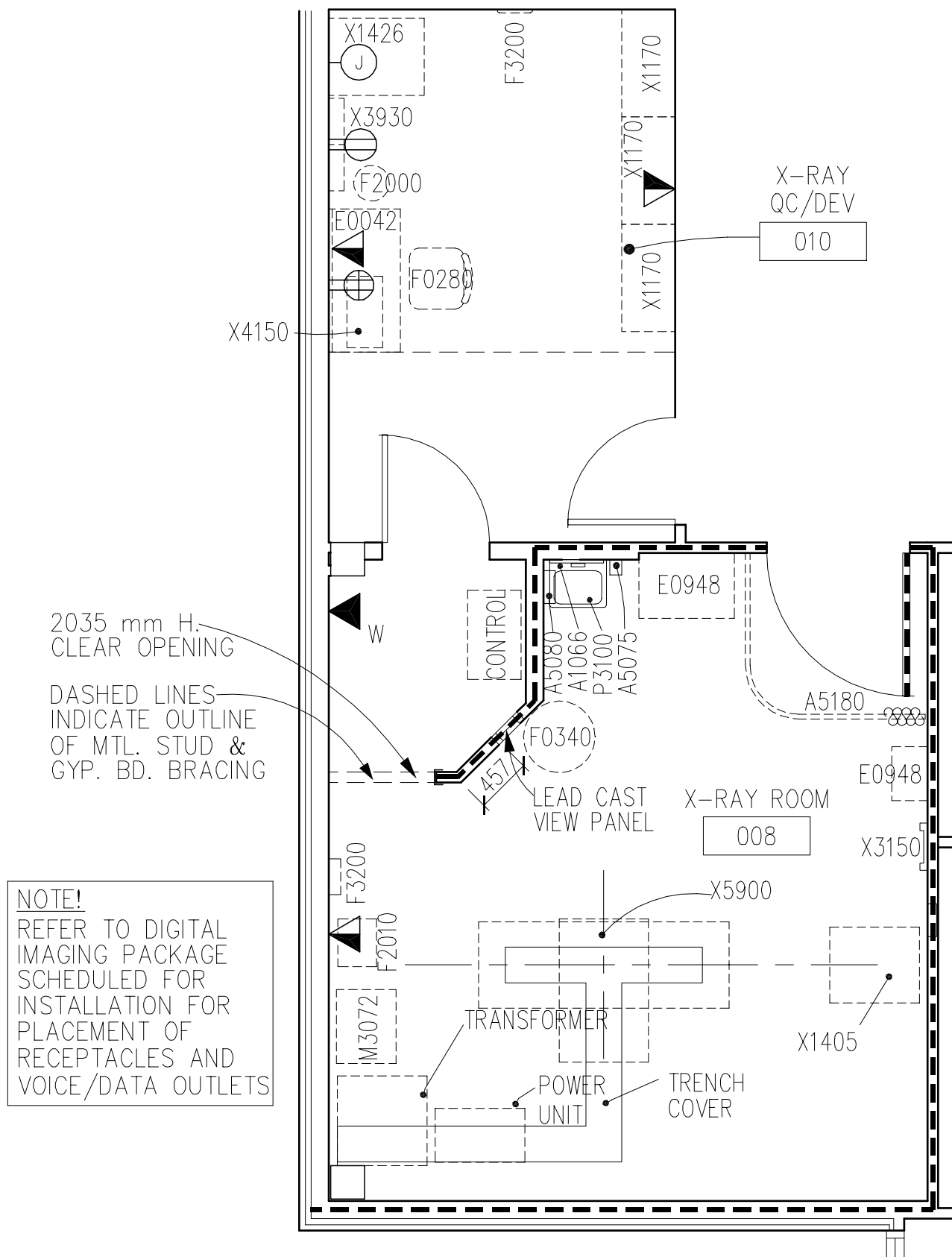
Applicable Room No.'s: 039



Design Requirements Diagram





X-ray Room
X-ray QC/DEV

Applicable Room No.'s: 008, 010






Design Requirements Diagram Communications Legend






PREMISES DISTRIBUTION SYSTEM:

- 1V,2D  VOICE/DATA OUTLET, WALL MOUNTED, FOR DESK MOUNTED INSTRUMENTS, NOTATION BESIDE OUTLET INDICATES NUMBER OF VOICE AND DATA JACKS
- 1V,2D  VOICE/DATA OUTLET, FLUSH FLOOR MOUNTED, NUMBER OF JACKS SIMILAR TO VOICE/DATA OUTLET ABOVE.
- W  VOICE OUTLET, WALL MOUNTED FOR WALL MOUNTED INSTRUMENT. MOUNT 9" FROM WALL SWITCH OUTLET.
- P  VOICE OUTLET, WALL MOUNTED FOR PAY TELEPHONE INSTRUMENT. PROVIDE 1 VOICE CABLE.

PATIENT DISTRESS SYSTEM:

- EL  TOILET LAVATORY EMERGENCY STATION WITH PULL CORD TO WITHIN 6" OF FLOOR, WALL MOUNTED.
- EC  EMERGENCY STATION WITH PULL CORD TO WITHIN 6" OF FLOOR, WALL MOUNTED.
- RC  EMERGENCY RED CORRIDOR LIGHT WITH INTEGRAL CHIME, CEILING MOUNTED.

INTRUSION DETECTION SYSTEM:

-  BALANCED MAGNETIC SWITCH, MOUNT IN TOP OF DOOR FRAME.
-  INTRUSION DETECTION SYSTEM CONTROL PANEL, WALL MOUNTED.
-  ENTRY KEYPAD/ANNUNCIATOR, WALL MOUNTED.
-  PASSIVE INFRARED DETECTOR, CEILING MOUNTED.
-  ROLL UP DOOR CONTACT.

Design Requirements Diagram Communications Legend

TELEVISION DISTRIBUTION SYSTEM (TVDS):



TELEVISION OUTLET, WALL MOUNTED, MOUNTED HIGH.

PUBLIC ADDRESS SYSTEM:



SPEAKER, RECESSED, CEILING MOUNTED.



VOLUME CONTROL, WALL MOUNTED.

MISCELLANEOUS:



CONNECTION TO INDICATED EQUIPMENT

Design Requirements Diagram

Electrical Legend

NOTE: THIS LEGEND REFERS TO THE REQUEST FOR PROPOSAL (RFP) ONLY.

ABBREVIATIONS:


EX EXISTING
FUT. FUTURE, EMPTY BOX AND CONDUIT ONLY.


JUNCTION BOXES:


 WITH FLEXIBLE CONNECTION TO EQUIPMENT


RECEPTACLES:


BASIC RECEPTACLE TYPES WITH SUBSCRIPT MODIFIERS SHOWN BELOW.

 DUPLEX RECEPTACLE, WALL MOUNTED, 20A, 125V, 2P-3 WIRE,
NEMA 5-20R

 DOUBLE DUPLEX RECEPTACLE, WALL MOUNTED, 20A, 125V, 2P-3 WIRE,
NEMA 5-20R

 EMERGENCY POWER DUPLEX RECEPTACLE, 20A, 125V, 2P-3 WIRE, NEMA 5-20R

 FLUSH FLOOR MOUNTED DUPLEX RECEPTACLE WITH BRASS COVER,
20A, 125V, 2P-3WIRE, NEMA 5-20R

 SPECIAL RECEPTACLE – NEMA CONFIGURATION AS SHOWN

SUBSCRIPT MODIFIER LEGEND FOR BASIC RECEPTACLE TYPES:

*** NOTE: VERIFY WITH CONTRACTING OFFICER THE HEIGHT OF ALL
COUNTER TOPS, BACKSPLASHES, TABLE TOPS OR SINKS
WHICH AFFECT THE MOUNTING HEIGHT OF RECEPTACLES.

CT – RECEPTACLE MOUNTED 102mm (4”) ABOVE COUNTER TOP, BACKSPLASH, TABLE
TOP OR SINK TO CENTER OF RECEPTACLE
CW – RECEPTACLE MOUNTED IN CASEWORK
CTG – GFI RECEPTACLE MOUNTED 102mm (4”) ABOVE COUNTER TOP, BACKSPLASH,
TABLE TOP OR SINK TO CENTER OF RECEPTACLE
GFI – GROUND FAULT INTERRUPTING RECEPTACLE
TVH – TELEVISION RECEPTACLE MOUNTED 2134mm (84”) AFF AND ADJACENT TO TV
ANTENNA OUTLET UNLESS NOTED OTHERWISE
SR – OUTLET – TAMPER RESISTANT SAFETY TYPE

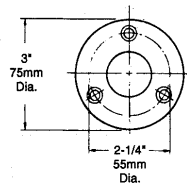
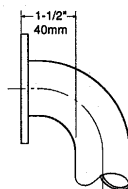
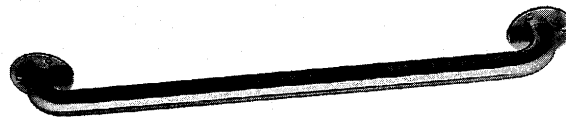
BOBRICK

Technical Data

1 1/4" (32mm) DIAMETER STAINLESS STEEL GRAB BARS WITH EXPOSED MOUNTING

B-490 SERIES

Specify Finish Required: ☐ Satin finish
☒ Satin finish with peened gripping surface; add suffix .99 to model number



HORIZONTAL	VERTICAL	HORIZONTAL	WHEELCHAIR TOILET COMPARTMENT	HORIZONTAL TWO-WALL TUB/SHOWER/TOILET COMPARTMENT BAR 36 x 54
B-490 x 12, 18, 24, 30, 36, 42, 48		B-4901 x 48	B-493	B-4937
90° ANGLE	90° ANGLE	HORIZONTAL TWO-WALL BAR for 36 x 36 shower stall	HORIZONTAL TWO-WALL TUB/SHOWER/TOILET COMPARTMENT BAR 24 x 36	WALL TO FLOOR WITH SOCKET
B-494	B-495	B-4961	B-49616	B-4964
WALL TO FLOOR SWING AWAY		WALL MOUNTED SWING UP		
* B-4993		* B-4998		

* For more information, refer to Technical Data Sheet B-4993/B-4998

continued ...

The illustrations and descriptions herein are applicable to production as of the date of this Technical Data Sheet.
The manufacturer reserves the right to, and does from time to time, make changes and improvements in designs and dimensions.

Revised 8/95 Printed in U.S.A.
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MATERIALS:

Grab Bar — 18-8 S, type-304, 18-gauge (1.2mm) stainless steel tubing with satin finish. 1-1/4" (32mm) outside diameter. Ends are heliarc welded to flanges. Clearance between the grab bar and wall is 1-1/2" (38mm).

Flanges — 18-8 S, type-304, 1/8" (3mm) thick stainless steel plate with satin finish. 3" (76mm) diameter with three screw holes for attachment to wall.

STRENGTH:

Bobrick grab bars that provide 1-1/2" (38mm) clearance from wall can support loads in excess of 900 pounds (408kg) if properly installed. Other grab bar configurations can support loads in excess of 250 pounds (113kg) if properly installed, complying with barrier-free accessibility guidelines (including ADAAG in U.S.A.) for structural strength

Caution: Grab bars are no stronger than the anchors or walls to which they are attached and, therefore, must be firmly secured in order to support the loads for which they are intended.

INSTALLATION:

Provide concealed anchor device or backing as specified or required in accordance with local building codes before wall is finished. Fasten grab bar to anchor device or backing with three screws in each flange. Concealed anchor devices and mounting screws are not included with Bobrick grab bars and must be specified as an accessory.

Important Notes:

1. **Concealed Anchor Devices** — Bobrick has a complete selection of grab bar anchor devices available for all types of installations. All Bobrick concealed anchor devices include stainless steel machine screws to be used for attaching grab bars to anchors.

Concealed Anchor No.	Type of Installation
2561 Series	Anchor plate for stud wall construction.
2571	Anchor for solid wall construction; 1 anchor required for each flange.
2581	Anchor for installation of grab bar through toilet partition; 1 anchor required for each flange.
2591	Anchor for back-to-back installation of 2 grab bars through toilet partition; 1 anchor required for each pair of flanges.

2. **Mounting Kits** — Bobrick has a selection of mounting screws and fasteners available for different types of installations; **one Bobrick mounting kit is required for each flange.**

Mounting Kit No.	Description
252-30	Consists of (3) No. 14 x 2 1/2" (M6 x 64mm) type-304 stainless steel, Phillips round-head, sheet-metal screws.
2521-30	Consists of (3) 1/4"-20 x 3 3/4" (M6-1 x 89mm) type-304 stainless steel, Phillips round-head, machine screws with plated-steel toggle nuts.
2522-30	Consists of (3) 1/4"-20 x 2" (M6-1 x 51mm) type-304 stainless steel, Phillips round-head, machine screws with metal expansion shields.

For installation where vandalism is a concern, vandal-resistant, stainless steel, interrupted-slot, flat-head machine screws are available and should be ordered separately; order Bobrick Part No. 450-86.

SPECIFICATION:

Grab bar shall be type-304 stainless steel with satin finish. Grab bar shall have 18-gauge (1.2mm) wall thickness and 1-1/4" (32mm) outside diameter. Clearance between the grab bar and wall shall be 1-1/2" (38mm). Flanges shall be 1/8" (3mm) thick stainless steel plate, 3" (76mm) diameter, and equipped with three screw holes for attachment to wall. Ends of grab bar shall pass through flanges and be heliarc welded to form one structural unit. Grab bar shall comply with barrier-free accessibility guidelines (including ADAAG in U.S.A.) for structural strength

Grab Bar shall be Model _____ (insert model number) of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; and Bobrick Washroom Equipment of Canada Ltd., Scarborough, Ontario.

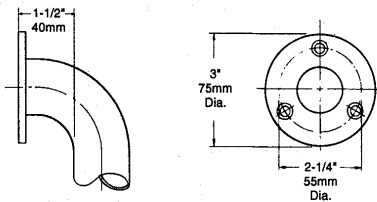
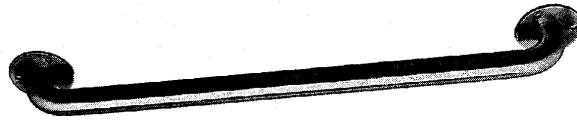
BOBRICK

Technical Data

1 1/4" (32mm) DIAMETER STAINLESS STEEL GRAB BARS WITH EXPOSED MOUNTING

B-490 SERIES

Specify Finish Required: ☐ Satin finish
☒ Satin finish with peened gripping surface; add suffix .99 to model number



HORIZONTAL	VERTICAL	HORIZONTAL	WHEELCHAIR TOILET COMPARTMENT	HORIZONTAL TWO-WALL TUB/SHOWER/TOILET COMPARTMENT BAR 36 x 54
B-490 x 12, 18, 24, 30, 36, 42, 48		B-4901 x 48	B-493	B-4937
90° ANGLE	90° ANGLE	HORIZONTAL TWO-WALL BAR for 36 x 36 shower stall	HORIZONTAL TWO-WALL TUB/SHOWER/TOILET COMPARTMENT BAR 24 x 36	WALL TO FLOOR WITH SOCKET
B-494	B-495	B-4961	B-49616	B-4964
WALL TO FLOOR SWING AWAY		WALL MOUNTED SWING UP		
* B-4993		* B-4998		

* For more information, refer to Technical Data Sheet B-4993/B-4998

continued ...

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The manufacturer reserves the right to, and does from time to time, make changes and improvements in designs and dimensions.

Revised 8/95 Printed in U.S.A.
© 1995 by Bobrick Washroom Equipment, Inc.

MATERIALS:

Grab Bar — 18-8 S, type-304, 18-gauge (1.2mm) stainless steel tubing with satin finish. 1-1/4" (32mm) outside diameter. Ends are heliarc welded to flanges. Clearance between the grab bar and wall is 1-1/2" (38mm).

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Caution: Grab bars are no stronger than the anchors or walls to which they are attached and, therefore, must be firmly secured in order to support the loads for which they are intended.

INSTALLATION:

Provide concealed anchor device or backing as specified or required in accordance with local building codes before wall is finished. Fasten grab bar to anchor device or backing with three screws in each flange. Concealed anchor devices and mounting screws are not included with Bobrick grab bars and must be specified as an accessory.

Important Notes:

1. Concealed Anchor Devices — Bobrick has a complete selection of grab bar anchor devices available for all types of installations. All Bobrick concealed anchor devices include stainless steel machine screws to be used for attaching grab bars to anchors.

Concealed Anchor No.	Type of Installation
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SPECIFICATION:

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Grab Bar shall be Model _____ (insert model number) of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; and Bobrick Washroom Equipment of Canada Ltd., Scarborough, Ontario.

MODEL	SWM314	SWM334
TV SIZE	13" - 16"	15" - 17"

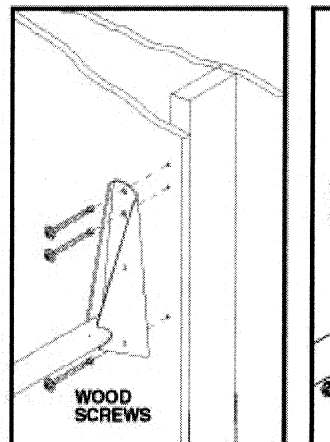
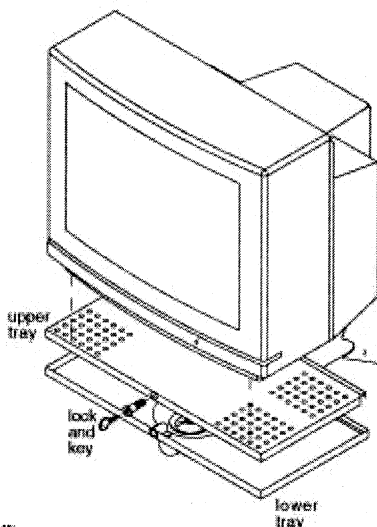
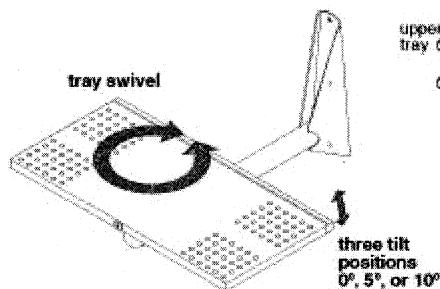
FEATURES:

The two piece locking support tray has three tilt positions (0°, 5°, 10°).

VCR mounting bracket (sold separately) attaches easily below the support tray.

See opposite side for specific dimensions.

TWO PIECE SECURITY SUPPORT TRAY. TV attaches to upper tray with fasteners provided. Then upper tray securely locks to lower tray.



Wood screws for attachment to a wood stud.
For attachment to a solid concrete, concrete block, or masonry wall, an optional accessory kit #ACC205 (includes three screws and a wall anchor) is required and can be ordered directly from Peerless Industries. By special order dealers may request this kit with the product.
For attachment to a metal stud wall, Extra Duty Wall Studs (WSP420 or WSP425) is required and can be ordered from Peerless Industries.

Architects Specifications:

The TV wall mount shall be a Peerless model SWM _____ and shall be located where indicated on the plans. The finish shall be scratch resistant Black Fused Epoxy. The point of attachment must be to a wood stud, metal stud, concrete block, brick, or solid concrete wall. The TV wall mount shall be constructed primarily of heavy gauge cold rolled steel and steel tubing. It shall feature a two piece support tray with key lock, three tilt positions and swivel. It shall be UL Listed. Assembly and installation shall be done according to instructions provided by the manufacturer.



THIS PRODUCT IS U.L. LISTED AND IS INTENDED FOR USE WITH U.L. LISTED TVs AND MONITORS ONLY.

TECHNICAL DATA SHEET SLIMLINE TV WALL MOUNTS

Peerless Industries, Inc.

1980 Hawthorne Ave.

phone: (708)

Melrose Park, IL 60160

fax: (708)

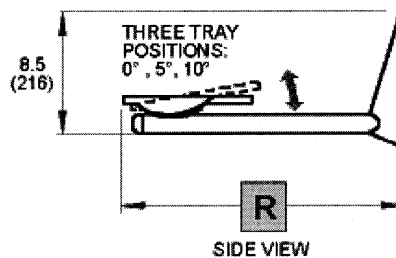
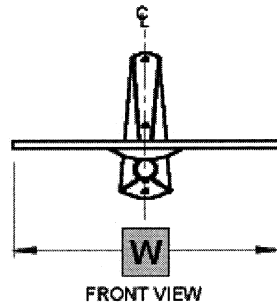
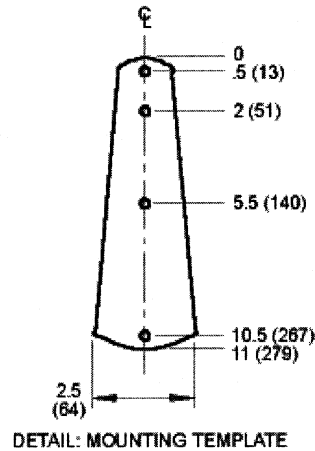
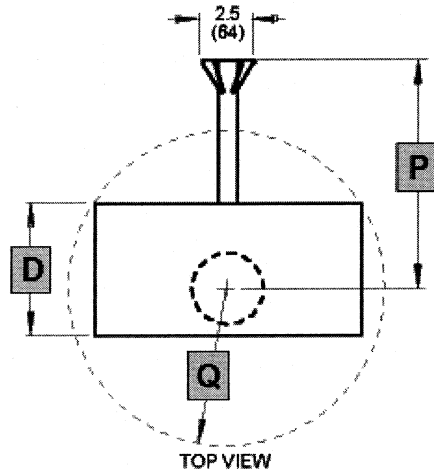
www.peerlessindustries.com

SHEET NO: 061-9602 ISSUED: 1-21-97

REVISION

PEERLESS INDUSTRIES, INC.
1980 HAWTHORNE AVE.
MELROSE PARK, IL 60160
(708)865-8800

MODELS SWM 314 & 334 TECHNICAL DATA:



MODEL#	*PRICE	TV / MONITOR SCREEN SIZE	DIMENSIONS					WT.	SHIP. WT.	MAX. LOAD
			D	P	Q	W	R			
SWM 314	\$ 62.00	13" - 16"	12.5 (318)	14.25 (362)	10.7 (272)	13 (330)	18.25 (464)	12 (14.5)	14 (7)	100 (45)
SWM 334	\$ 62.00	15" - 17"	12 (305)	14.25 (362)	11.7 (297)	17 (432)	18.25 (464)	14.5 (6.5)	16 (8)	100 (45)

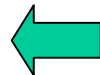
NOTES:

ALL DIMENSIONS: IN. (MM), ALL WEIGHTS: LB. (KG.)

MATERIAL: COLD ROLLED STEEL AND STEEL TUBING FINISH: BLACK FUSED EPOXY

*LIST PRICE SHOWN, SUBJECT TO CHANGE WITHOUT NOTICE

PEERLESS INDUSTRIES, INC.
1980 HAWTHORNE AVE.
MELROSE PARK, IL 60160
(708)865-8800



Equipment Cut Sheet

A5220

DA-LITE

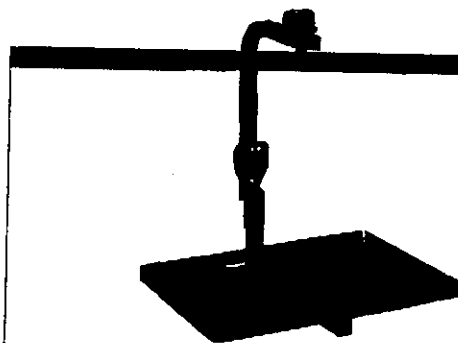


WMS-22

- Ideal for applications involving smaller monitors requiring limited adjustment.
- Fits small to mid-size monitors from 12" to 25" diagonal.
- Model WMS-22 swivels 70° and tilts from 0-15° for optimum viewing. Models WMS-22 and WMS-12 swivel 360° and also tilt from 0-15°.
- Heavy-duty single arm design constructed of 11-gauge steel tube with black or putty powder coated

- finish and perforated swivel tray. Supports up to 150 lbs.
- Models WMS-22 and WMS-12 include a safety belt for added security.
- Two model sizes: 9 1/4" L x 12" W WMS 12 and 13 1/2" L x 22" W WMS 22 offered with and without security lock.
- Models WMS-22 and WMS-12 are UL and C-UL listed.

WMS-22 \$82
WMS-22 \$107
WMS-12 \$82



CPM-1218

- Handles single-gun video projectors.
- Fits projectors with maximum dimension of 12" wide by 18" long and 16" high.
- Easy tilt adjustment swivels 360° and tilts 0-15° for easy projection.

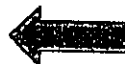
- Heavy-duty design constructed of 20-gauge steel tube with black or putty powder coated finish and perforated tray, adapts to most ceilings.
- Supports up to 75 lbs.
- Side support adjusts to height of projector.
- Includes safety belt for added security.

CPM-1218 \$125

Wall Mount Installation Options



Installed during the rough-in phase, the optional wall mounting plate allows the Wall Mount Shelf units to meet OSHPD R-0380 rating and provides cut outs for mounting electrical or communication outlet boxes.



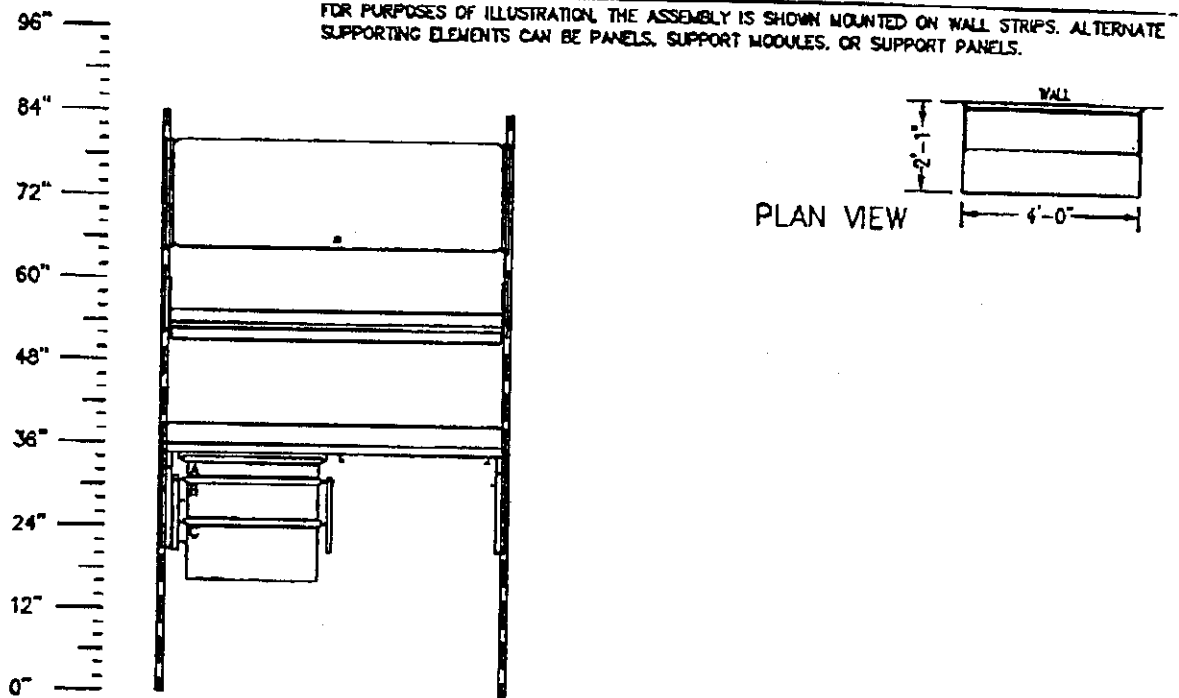
DA-LITE SCREEN CO., INC., 3100 N. DETROIT STL, WARSAW, IN 46581, 800-622-3737

Equipment Cut Sheet

E1130

STANDARD: MOVABLE MODULAR CASEWORK
 PROJECT: JSN TYPICALS - "E" NUMBERS
 DATE: Mar 19, 1991

WORK STATION
 MODULAR, CLINICAL



SCALE: 1/2"=1'-0"

QTY	PRODUCT NUMBER	DESCRIPTION
1	A01202LT31XX	FLIPPER DOOR UNIT 15"H X 48"W X 12"D
2	A01316FFLT	WALL HANGER STRIP 84"H
1	A043SLT	STORAGE/DISPLAY SHELF 7"H X 48"W X 12"D
1	C2111.2448LT	HEAVY-DUTY STORAGE 24D 48W
1(S)	C2910.48LT	48W BACKSLASH
1	C0205FFLT	C FRAME 22"W X 17"D
1	C0207FFLT	DRAWER: A-SIZE 3"H X 20"W X 15"D
1	C0208FFLT	DRAWER: B-SIZE 6"H X 20"W X 15"D
1	C0209FFLT	DRAWER: C-SIZE 8"H X 20"W X 15"D
1	C6110.48LT	TASK LIGHT FOR 48" COMPONENT WIDTH

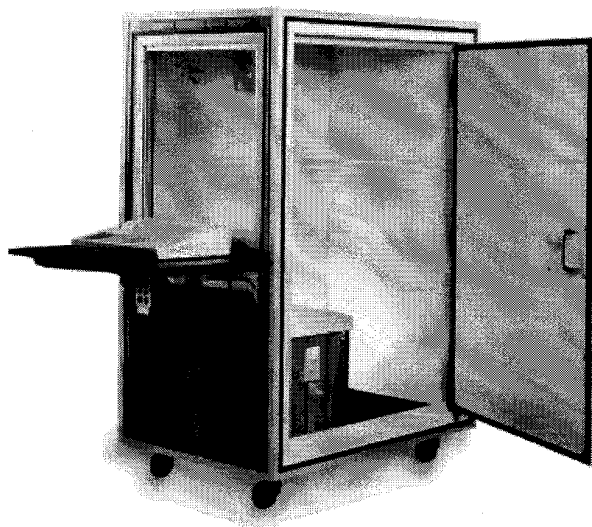
THIS ELEVATION AND PRODUCT LISTING SHALL BE USED ONLY FOR PLANNING AND ESTIMATING PURPOSES



AR9S Audiometric Test Booth

An attractive, portable environment for valid hearing testing

For accurate results, a quiet testing environment is necessary so the subject's responses are not affected by ambient noises. Tremetrics offer an attractive hearing test booth, the AR9S, designed specifically for clinics and industrial facilities. These one-person booths come completely assembled, prewired, ready to use. They are compact, portable and have sufficient noise reduction capabilities for most applications. Choose the door swing and seating combination that matches your specific testing requirements.



Check the extra value features

- Superior sound attenuation
- Extra wide, side entry door for ease of access
- Rugged, inset steel door and hinge assembly to protect acoustic integrity
- Safe, magnetic door seal instead of a mechanical latch
- Attractive woodgrain exterior.
- Choice of four custom floor plans. [Click to view available configurations](#) in a (24 KB) .PDF format .

Specifications ([click here](#))

Updated 01-07-99. Please send comments to webmaster@tmqaustin.com. All rights reserved. ©1999 ThermoQuest Corporation.

AR9S Test Booth Specifications

Performance:

Center Frequency	Noise Reduction
250 Hz	32 dB
500 Hz	38 dB
1000 Hz	46 dB
2000 Hz	49 dB
4000 Hz	50 dB
8000 Hz	54 dB

With the proper selection of location the AR9S meets requirements of ANSI 1960 (R-1971) "Criteria for Background Noise in Audiometer Rooms."

Door: Inset steel with continuous magnetic seal.

Window: 21" x 23", double glazed 1/4" safety glass.

Ventilation: Silenced forced air and exhaust system built into seat assembly. Noise levels with ventilation comply with ANSI standards.

Electrical: Units are pre-wired and include a 73-wire grounded power cable, ventilation fan control and 25 watt light fixture.

Jack panel: Standard configuration includes four 3-conductor phone jacks with covers, one 3-pin and one 4-pin Cinch-Jones connector.

Isolation: supplied with four permanently mounted rubber vibration isolators or optional rubber-coated locking casters.

Carpet: Washable, commercial quality carpeting.

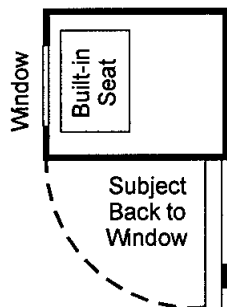
Dimensions: Height 65", Width 42", Depth 30 1/2". Shipping weight 700 lbs.

Power: 115 volts, 60 Hz. Optional 230 Volts, 50 Hz.

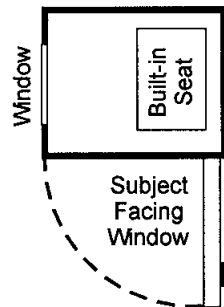
Please send comments to webmaster@tmgaustin.com. All rights reserved. ©1998 ThermoQuest Corporation.

AR9S Floor Plans

Right Hinge Door

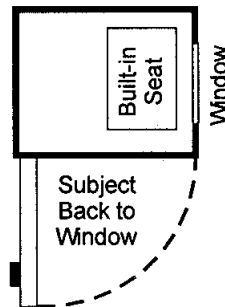


Plan A

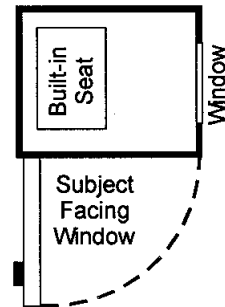


Plan B

Left Hinge Door



Plan C



Plan D

77004-0011
981217

PharmASSIST SmartCabinet

Unparalleled Flexibility in Automated Dispensing

With prescription volumes continuing to rise and pharmacists striving to deliver pharmaceutical care, automated prescription dispensing has moved to the forefront of pharmacy operations. Using PharmASSIST SmartCabinet's precise dispensing and unparalleled flexibility, your pharmacy can handle peak filling periods more reliably and expeditiously, easing the pressure on your pharmacy staff and freeing up your pharmacists for patient counseling.

PharmASSIST SmartCabinet™ offers the ultimate in flexibility, allowing you to build a customized solution for your pharmacy. Depending on your pharmacy's prescription volume, workflow methodology, and staff size, you have multiple system configurations and physical setups from which to choose. You can:

- Use SmartCabinet as an automated dispensing unit (i.e., basic counting and dispensing) that is integrated with your existing pharmacy management software system (PMSS) – with or without PMSS workflow features.
- Add up to three PharmASSIST Standard Cabinets to your SmartCabinet system. You can install the cabinets in various physical configurations (e.g., end caps, aisles, corners, etc.).
- Upgrade your SmartCabinet system to a PharmASSIST Enterprise System by adding PharmASSIST Workflow Software and Standard Workstations.

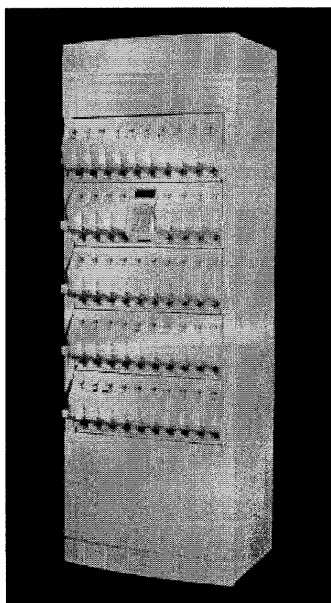
Whether you need basic automated dispensing, flexible physical configurations, or straightforward expandability, SmartCabinet delivers on all fronts.

Standing on its Own

The stand-alone SmartCabinet is the perfect choice for pharmacies with low to mid prescription volumes or for pharmacies looking to get started with automation. By integrating SmartCabinet with your existing PMSS system, you'll greatly enhance the quality of your prescription filling process and lay the groundwork for your pharmacy's future growth.

The SmartCabinet's main components are its 48 tablet and capsule dispensers, the SmartCell™, a Pentium PC, a modem, and an uninterruptible power supply.

Acting as your command center for all automated filling, replenishment, and inventory-related tasks, the SmartCell consists of a keypad, an LCD display, and a hands-free scanner. The PC, which is housed in the bottom of the cabinet, receives orders from your pharmacy management system and maintains an audit trail of all SmartCabinet activity.



SmartCabinet

Operation is Simple

Upon receiving orders from your pharmacy management system, SmartCabinet verifies the availability of medications and their quantities. Once verified, SmartCabinet dispensers simultaneously count all appropriate orders and store them in their secure internal buffers. To retrieve the orders, you simply follow the SmartCell display's tutorial-like instructions and the dispensers' visual cueing to guide you through each step. To speed up filling and improve efficiency, multiple operators can process orders simultaneously. Once again, SmartCabinet's flexibility shines through as its simultaneous counting and simultaneous order processing eases your staff's workload.

You can also use SmartCabinet's Quick Rx feature to enter and dispense orders on the fly (i.e., without PMSS data). You simply enter an order using the SmartCell's keypad and follow the instructions displayed on the SmartCell's

display to dispense the medication. It's quick, easy, and convenient.

To ensure that your pharmacy delivers the highest quality prescription dispensing, SmartCabinet mirrors the PharmASSIST Enterprise System's use of barcode scanning and software protocols for all automated dispensing tasks. The end result – system performance and process integrity that's second to none.

SmartCabinet Benefits

Delivers Unparalleled Quality

- Accurately counts all types of tablets/capsules.
- Highly disciplined Rx Filling and Replenishment protocols deliver unparalleled process integrity.
- Gently handles all tablets/capsules.

Easily Integrates into Existing Operations

- Modular compact design fits into existing pharmacy layouts, minimizing renovations and operational disruption.
- Easily configured to meet changing operational requirements.
- Easily integrates with your existing pharmacy management system.

Creates a Happier & More Productive Workforce

- Reduces stress and turnover of staff.
- Frees up pharmacists for customer interaction.
- Enables pharmacists to realize greater job satisfaction.

Fosters Strong Customer Loyalty

- Reduces customer wait time.
- Increases customer access to pharmaceutical care.
- Improves quality of customer service.

Provides a Growth Path for Your Pharmacy

- Modular design allows for the installation of additional Standard cabinets as volumes grow.
- Easily upgraded to the PharmASSIST Enterprise System by adding PharmASSIST Workflow Software.

Positively Impacts Your Bottom Line

- Leverages the overall effectiveness of your pharmacists.
- Dramatically reduces pharmacy redesign costs.
- Optimizes your prescription filling process.
- Delivers the cost-effective solution that fits into your budget.

SmartCabinet Specifications

SmartCabinet Components

- Cabinet – Dimensions: 75" x 26.25" x 16.375"
- 48 Dispensers
- PharmASSIST TCD Controller Software
- Smart Cell – Alphanumeric Keypad, LCD Display, RF Barcode Scanner
- 333 Mhz Pentium II PC
128 MB RAM
8.0 GB Hard Drive
Microsoft® Windows NT® Server Version 4.0
Microsoft SQL Server Version 7.0
- Modem (56K Baud Rate)
- Uninterruptible Power Supply (UPS)

Dispenser Characteristics

- Dimensions: 8.25" x 15" x 2.25"
25% the size of the current industry benchmark.
- Hopper – Capacity 800 cc
Standard locked Hopper Door.
- Buffer – Capacity 100 cc
Stores counted product in internal buffer until computer-controlled release.
- Faceplate – Has cutout to display both a descriptive label and an actual medication.
- Computer-controlled and handles all tablet/capsule types; no part changes or mechanical adjustments are necessary.
- Multiple dispensers can count simultaneously.

Miscellaneous

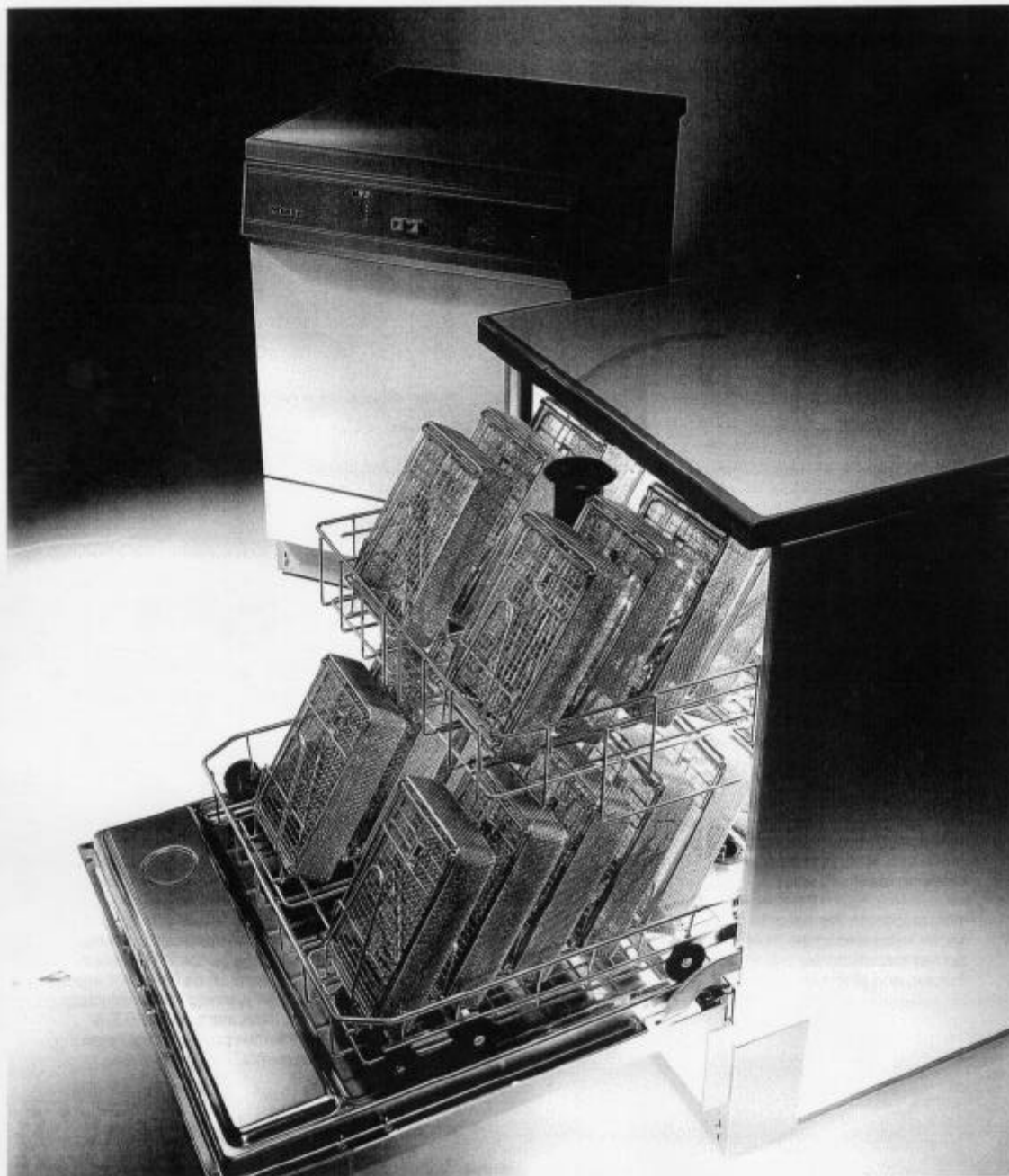
- 110V AC power – one grounded outlet per cabinet.
- Standard telephone jack required for modem connection.
- Cabinet installation requires either wall or floor mounting.



Take the first step. Contact the PharmASSIST Sales Team at 877-742-7627 or e-mail johnf@innovat.com and arrange for a live demonstration of PharmASSIST SmartCabinet. See first hand how PharmASSIST can make an impact on your business.

G 7781
Dental
Thermal Disinfector

Miele[®]
DENTAL-TECHNOLOGY



G 7781 Dental Thermal Disinfector

Innovative Technology

Electrical connection	1 or 3 phase 208 V 60 Hz
Connected load	6.0 kW
Fuse rating	Single phase: 30 A per phase Three phase: 20 A per phase
Heater rating	5.4 kW

Water inlet max. pressure 36-145 psi (2.5-10 bar), programmable to 15-145 psi (1.0-10.0 bar).
Cold water for G 7781 via pressure hose 70".
Cold water for steam condenser via pressure hose 70".
Drain via 2 drain hoses 7/8" I.D. for permanent installation. Drain pump with max. delivery head of 36".

Appliance dimensions:	Height 33 1/2" (32 1/4" without lid) Width 23 1/2" Depth 23 1/2"
Internal dimensions:	Height 19 5/8" Width 21 1/16" Depth 19 5/8"
Operating noise level:	dB (A)
Free standing operation:	64.9
Built-in operation:	60.9
Heat radiation:	2.23 MJ/h
Net weight:	144 lbs.

Ready for work

The G 7781 Dental Thermal Disinfector comes equipped complete with hoses for water inlet and drain, as well as cable for electrical connection. Cold water and electrical supply as well as drain connections must be provided on-site and be ready for installation.

Cold water supply

A minimum of one 1/2" cold water supply line with two standard 3/4" hose thread faucets is needed (one faucet each for the machine and for the steam condenser). The water pressure should be between 15 and 145 psi (1.0 and 10.0 bar). The machine should be connected to the water supply in accordance with all national and local plumbing codes. The faucets should be situated as near to the machine as possible.

Electrical supply

The machine comes equipped for connection to a 208 V 60 Hz single phase power supply. It can, however, be set up to run on a three phase power supply (please refer to specifications in the table). All connections should be made according to national or local codes. A dedicated single or three phase line incorporating the appropriate circuit breakers should be situated as near to the machine as possible. The machine may be hard-wired into an appropriate junction box or plugged in via the use of a plug and receptacle.

Consumption data (cold water 15°C/59°F)	Disinfection 93°C-10'	Wash 93°C	Wash	Rinse
Program duration (min.)	46	41	32	4
Current (kWh)	2.66	2.84	1.87	0.02
Water (gal.) G 7781 Steam condenser	9.7 8.2	9.7 8.2	12.5 2.4	2.8 -
Detergent Powder (oz.) Liquid (fl.oz.)	1 1.8	1 1.8	1 1.8	- -
Neutralizer (fl.oz.)	0 - 0.35	0 - 0.35	0 - 0.35	-
Rinse aid (fl.oz.)	0 - 0.2	0 - 0.2	0 - 0.2	-

Drain connections

Two drain connections are required, preferably two standard stack drain pipes, max. 36" from floor, 1 1/2-2" inner diameter for drain hoses (one each for the machine and for the steam condenser). The drain connections should be situated as near to the machine as possible.

Steam Condenser

The Steam Condenser is automatically activated at temperatures above 55°C/130°F in the disinfection program. This prevents the escape of steam and vapors from the machine and eliminates the annoyance of unpleasant odors. More importantly, this also ensures that no contaminated aerosols can affect the environment.

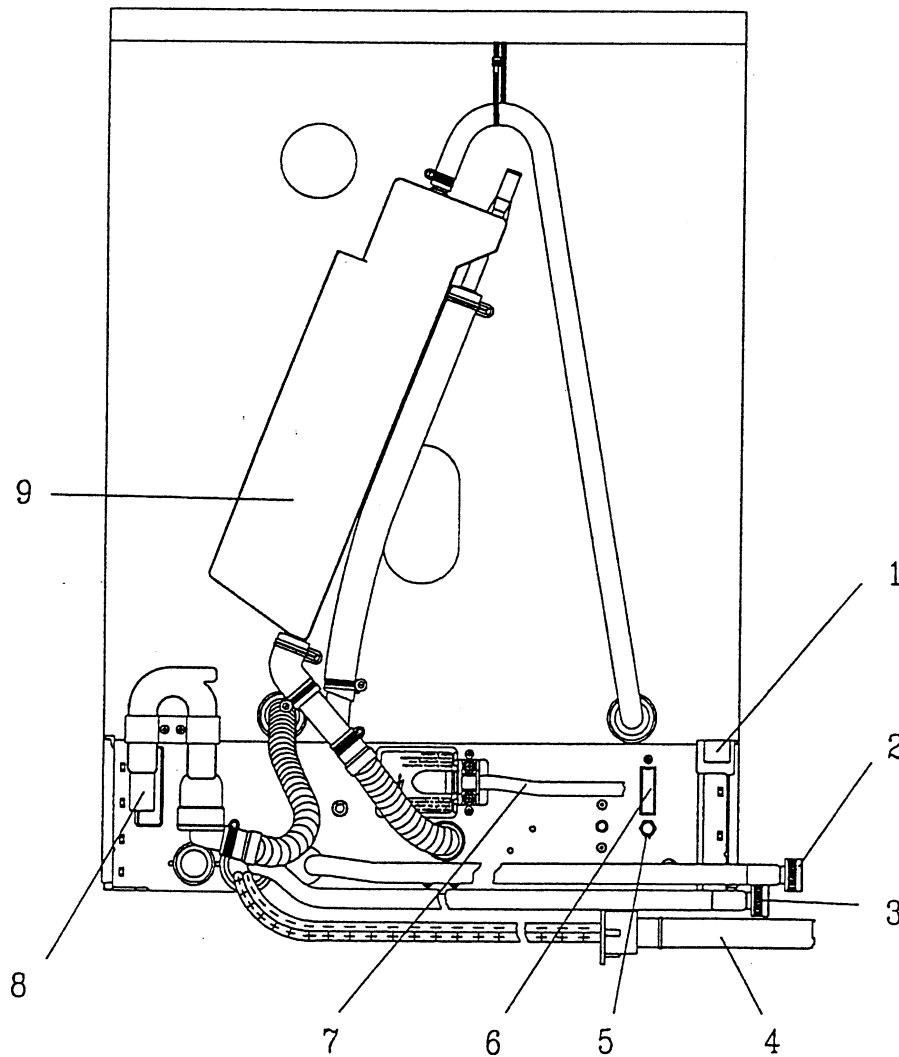
Dispensers

The G 7781 Dental Thermal Disinfector features 3 dispensing units as standard:

DOS 1: Dispensing unit with lid located on the inside of the door for powder detergents.
DOS 2: Automatic dispensing unit for rinse aid. Dispensing is adjustable from 0.035 - 0.2 fl.oz. (1-6 ml).
DOS 3: Dispenser pump DOS 10 for neutralizer with external 1.32 gal. (5 l) storage tank.

4.2

G 7781 rear view (Fig. 2)



2

- 1 Drain connection – Machine
- 2 Water inlet hose – Machine
- 3 Water inlet hose – Steam condenser
- 4 Integrated dispenser pump suction tube (Neutralizer)
- 5 External DOS dispenser hose connection (Detergent)
- 6 External DOS dispenser socket connection (Detergent)
- 7 Power cable
- 8 Drain connection – Steam condenser
- 9 Steam condenser

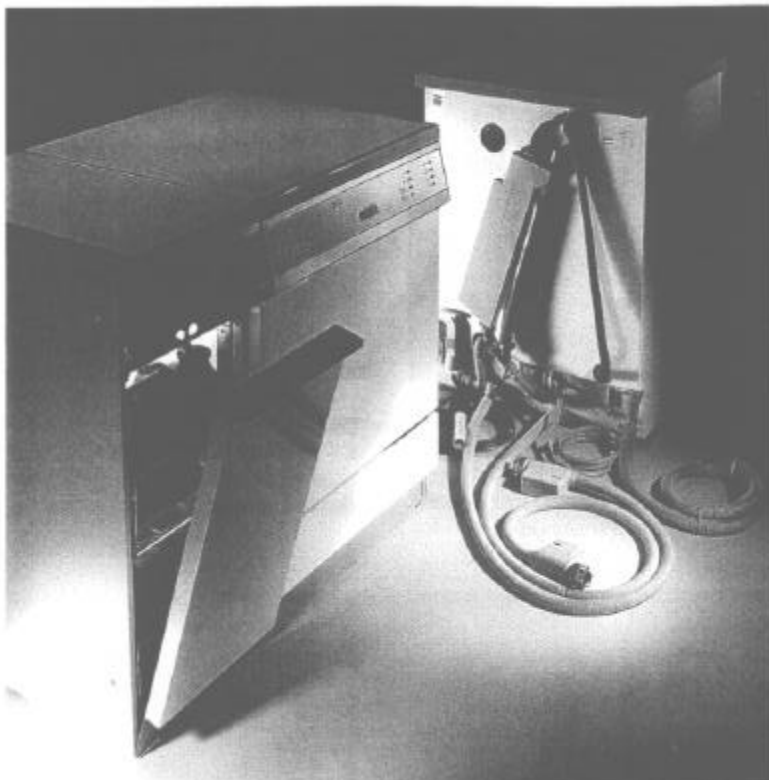
G 7781 Dental Thermal Disinfector

Miele[®]
DENTAL-TECHNOLOGY

The G 7781 Dental Thermal Disinfector can be supplemented by suitable extras such as the G 7796 Dispensing Unit, the DOS Module C 60, a base, disinfection control tubes, and appropriate chemical agents. They were engineered to enhance this cleaning and disinfecting system to the highest degree possible.

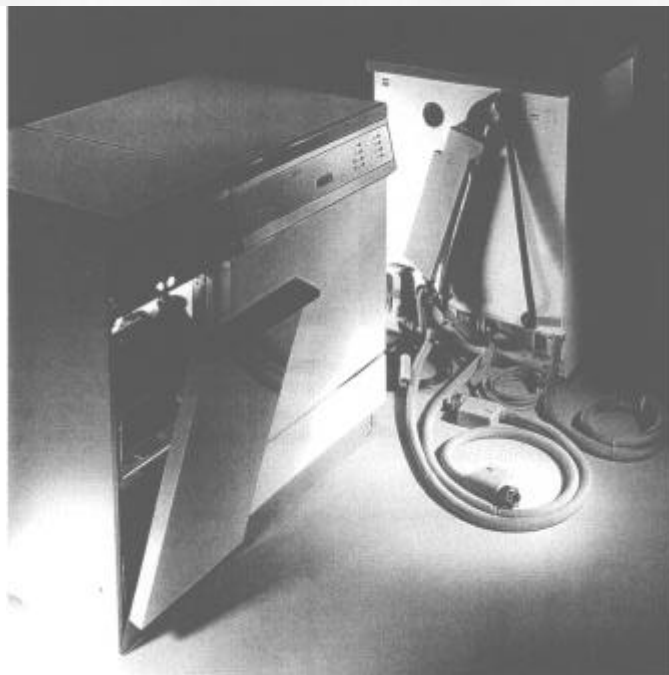
Stainless steel base

In case the machine is set up as a free standing unit, the use of the stainless steel base is recommended. The base is 11 ¹³/₁₆" high and elevates the door of the G 7781 Dental Thermal Disinfector to an ergonomically optimal height for loading and unloading.



G 7781 Dental Thermal Disinfector

Miele[®]
DENTAL-TECHNOLOGY



The G 7781 Dental Thermal Disinfector can be supplemented by suitable extras such as the G 7796 Dispensing Unit, the DOS Module C 60, a base, disinfection control tubes, and appropriate chemical agents. They were engineered to enhance this cleaning and disinfecting system to the highest degree possible.


G 7796 Dispensing Unit

The G 7796 Dispensing Unit can hold up to 4 DOS Modules C 60 and 4 chemical storage containers. It matches the finish of the G 7781 Dental Thermal Disinfector perfectly, and provides a practical as well as safe storage for the chemicals. One G 7796 Dispensing Unit can serve up to two G 7781 Dental Thermal Disinfectors.

(shown at left)

The Tuttnauer **Automatic Autoclave (E)** fills, sterilizes and exhausts at the touch of a button. The autoclave is pre-loaded with parameters for four standard programs. These can be customized by the operator for their individual requirements.

The Tuttnauer E Series is also available in a quick cycle model, the **Kwiklave (EK)**. These sterilizers offer all the proven, dependable features of our Automatic autoclave, with the added benefit of reducing the total sterilization cycle time by 50%. Speed and reliability are accomplished without sacrificing load size. Kwiklave is the perfect choice for quick instrument turn-around or a high-volume office.



Model	Chamber Dimensions	Overall Dimensions
1730E/EK	2gal 6.7" x 13.4"	17.9" x 17.4" x 12"
2340E/EK	5gal 9" x 18.5"	21.5" x 20" x 14.4"
2540E/EK	6gal 10" x 18.7"	21.5" x 20" x 14.4"
3870E	22gal 15.1" x 29.9"	34.5" x 26" x 20.6"

FEATURES:

- Pre-loaded cycles for: unwrapped instruments; wrapped/packs; liquid and additional drying cycle.
- All program parameters can be changed and stored.
- Automatic shut off at the end of both the sterilization and dry cycles.
- Audible and visual cycle interruption alert.
- Double safety locking device prevents door from opening while chamber is pressurized.
- Low water sensor prevents activation of sterilization cycle when there is insufficient water in the chamber or reservoir.
- Constant monitoring of temperature and pressure for sterilization.
- Power outage recovery system.
- Door design prevents steam from coming in contact with control panel.
- Optional printer.



E SERIES AUTOMATIC AUTOCLAVE



OPTIONAL PRINTER

Provides documentation of an entire cycle. Available in 9", 10", and 15" chamber sizes.

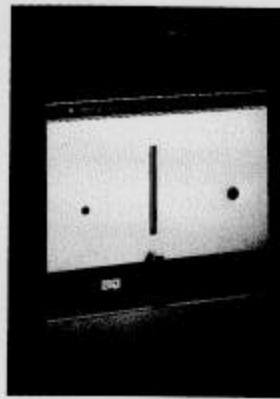
TUTTNAUER USA CO. LTD
33 Comac Loop, Equi-Park
Ronkonkoma, NY 11779, U.S.A.
TEL: (516) 737-4850, (800) 624-5836
FAX: (516) 737-0720
Email: www.tuttnauer.com

Distillation

We've got pure water all locked up with our cabinetized stills. These complete water distillation and storage systems produce and store biologically pure water (meeting ASTM Type II standards) for easy, fully automatic use and installation by lab personnel. What's more, these stills allow for hands-free operation and take up less lab space than conventional units.



210 Cabinetized Still (cover off)



525 Cabinetized Still



BENEFITS

- Choose from two sizes.
- Completely cabinetized: Includes a still and an appropriately matched tin-coated storage tank in a neat, compact and clean unit.
- Space saving design takes up less space than conventional units, while allowing for point of use installation.
- Fully Automatic: Hands-free

operation; turns still off when the tank is full, restarts still when tank empties.

- Automatically drains the boiling chamber every time the unit is off and every 4 hours of operation, helping to keep your still clean.

Model 210 Still

- Safety feature: interrupts power to heating elements if feed water is

off.

- Optional bench stand for bench mounting of still.
- 2 GPH still and 10 gallon storage tank for the production of distilled water.

Model 525 Still

- Purity meter alerts you of distilled water purity in storage tank.

- Q-Baffle® allows for pyrogen removal.
- Optional recirculation pump and base mounting stand available.
- Storage tank is equipped with a UV lamp for bacterial control.
- 5 GPH still and 25 gallon storage tank for production of distilled water.

Model 210 Still

Model #	Electrical	Phase	Drain (WA) Connection	Water Inlet	Amps	Shipping Weight	Dimensions WxDxH (cm)	Price
A1065-B	210 Volt 2 wire	1	1 3/8"	1/2" NPT	26	165 lbs. (75 kg)	24"x15 1/4"x41" (60x39x102.5)	
A1065-C	208 Volt 4 wire	3	1 3/8"	1/2" NPT	17	165 lbs. (75 kg)	24"x15 1/4"x41" (60x39x102.5)	
A1065-D	240 Volt 2 wire	3	1 3/8"	1/2" NPT	16	165 lbs. (75 kg)	24"x15 1/4"x41" (60x39x102.5)	
A1065-E	480 Volt 3 wire	3	1 3/8"	1/2" NPT	8	165 lbs. (75 kg)	24"x15 1/4"x41" (60x39x102.5)	
A1066	Optional Floor Stand							

*Note: Controls for all models require separate 120 volts.

Email: mkt@barnsteadthermolyne.com
 Fax: 1-319-589-0516
 Call: 1-800-446-6060 7:30am-5:00pm CST
 1-800-553-0039
 Write: Barnstead/Thermolyne
 255 Kerper Boulevard
 Dubuque, Iowa USA 52001-1478

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ATTACHMENT NO. 3

SPECIFICATION USAGE

PART A: List of Unified Facilities Guide Specifications (UFGS)

PART B: Omaha District Guide Specs.

PART C: Government Edited Technical Guide Specifications

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PART A

List of Unified Facilities Guide Specifications (UFGS)

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01240A	05/00	COST AND PERFORMANCE REPORT
01270A	02/94	MEASUREMENT AND PAYMENT
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02115N	09/99	REMOVAL AND DISPOSAL OF UNDERGROUND STORAGE TANKS
02120A	10/96	TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS
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02230a 06/97 CLEARING AND GRUBBING
 02231N 09/99 CLEARING AND GRUBBING
 02233a 11/92 CLEARING (TIMBER AND STRUCTURE)
 02251a 09/95 FOUNDATION DRILLING AND GROUTING
 02260a 09/98 SOIL-BENTONITE SLURRY TRENCH FOR HTRW PROJECTS
 02261a 10/92 SOIL-BENTONITE SLURRY TRENCH CUTOFF
 02300a 12/97 EARTHWORK
 02301N 09/00 EARTHWORK FOR STRUCTURES AND PAVEMENTS
 02302N 09/99 EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES
 02315N 01/01 EXCAVATION AND FILL
 02315a 08/98 EXCAVATION, FILLING AND BACKFILLING FOR BUILDINGS
 02316a 11/97 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS
 02318a 10/00 TEST FILL
 02325N 09/99 DREDGING
 02330a 08/94 EMBANKMENT FOR EARTH DAMS
 02331a 08/99 LEVEE CONSTRUCTION
 02332a 08/99 REINFORCED SOIL SLOPE
 02361N 01/02 SOIL TREATMENT FOR SUBTERRANEAN TERMITE CONTROL
 02362N 01/02 BASALTIC TERMITE BARRIER
 02363N 09/01 TERMITE CONTROL BARRIER SYSTEM
 02364a 06/98 TERMITICIDE TREATMENT MEASURES FOR SUBTERRANEAN TERMITE CONTROL
 02370a 03/00 SOIL SURFACE EROSION CONTROL
 02371a 10/01 WIRE MESH GABIONS [AND MATTRESSES]
 02372a 10/01 WASTE CONTAINMENT GEOMEMBRANE
 02373 09/01 GEOTEXTILE
 02374a 12/99 GEOSYNTHETIC DRAINAGE LAYER
 02375a 10/00 GEOGRID SOIL REINFORCEMENT
 02376a 03/98 GEOSYNTHETIC CLAY LINER (GCL)
 02377a 04/99 CLAY BARRIER LAYER
 02378a 05/95 GEOTEXTILES USED AS FILTERS
 02380a 10/01 STONE, CHANNEL, SHORELINE/COASTAL PROTECTION FOR STRUCTURES
 02390a 07/98 MOORING AND GROUNDING POINTS FOR AIRCRAFT
 02395N 09/99 PRESTRESSED CONCRETE FENDER PILING
 02396N 09/99 RESILIENT FOAM-FILLED MARINE FENDERS
 02397N 09/99 ARCH-TYPE RUBBER MARINE FENDERS
 02398N 09/99 PIER TIMBERWORK
 02430a 07/95 TUNNEL AND SHAFT GROUTING
 02441N 09/99 TRENCHLESS EXCAVATION USING MICROTUNNELING
 02453a 10/01 PRESTRESSED CONCRETE PILING FOR CIVIL WORKS
 02454a 02/98 PRECAST CONCRETE PILING
 02455a 11/97 CAST-IN-PLACE CONCRETE PILES, STEEL CASING
 02456N 09/01 PRESTRESSED CONCRETE PILES
 02456a 02/98 STEEL H-PILES
 02457N 09/99 STEEL SHEET PILES
 02457a 02/98 ROUND TIMBER PILES
 02458N 09/99 TIMBER PILES
 02458a 02/98 PRESTRESSED CONCRETE PILING
 02459N 09/99 CAST-IN-PLACE CONCRETE PILES
 02459a 02/98 PILING: COMPOSITE, WOOD AND CAST IN-PLACE CONCRETE
 02460N 09/99 STEEL H PILES
 02461N 09/99 WOOD MARINE PILES
 02461a 10/01 ROUND TIMBER PILES FOR HYDRAULIC STRUCTURES
 02463a 10/01 STEEL H-PILES FOR CIVIL WORKS
 02464a 05/92 METAL SHEET PILING
 02465a 11/97 AUGER-PLACED GROUT PILES
 02466N 09/99 PRESSURE-INJECTED FOOTINGS
 02466a 12/97 DRILLED FOUNDATION CAISSONS (PIERS)
 02467N 09/99 AUGER CAST GROUT PILES
 02468N 09/99 DRILLED FOUNDATION CAISSONS

02490 12/01 SOIL AND ROCK ANCHORS
 02510N 09/00 WATER DISTRIBUTION
 02510a 04/98 WATER DISTRIBUTION SYSTEM
 02521N 09/99 WATER SUPPLY WELL
 02521a 11/99 WATER WELLS
 02522a 05/98 GROUND-WATER MONITORING WELLS
 02525N 09/99 [EXTRACTION] [MONITORING] WELLS
 02525a 09/01 RELIEF WELLS
 02530N 09/99 SANITARY SEWERAGE
 02531a 04/01 SANITARY SEWERS
 02532a 07/98 FORCE MAINS AND INVERTED SIPHONS; SEWER
 02551N 08/01 NATURAL GAS DISTRIBUTION
 02552N 08/01 EXTERIOR SHALLOW TRENCH STEAM DISTRIBUTION
 02552a 12/01 PRE-ENGINEERED UNDERGROUND HEAT DISTRIBUTION SYSTEM
 02553N 08/01 EXTERIOR UNDERGROUND STEAM DISTRIBUTION SYSTEM
 02553a 12/01 HEAT DISTRIBUTION SYSTEMS IN CONCRETE TRENCHES
 02554N 08/01 EXTERIOR ABOVEGROUND STEAM DISTRIBUTION
 02554a 12/01 ABOVEGROUND HEAT DISTRIBUTION SYSTEM
 02555N 08/01 EXTERIOR FUEL DISTRIBUTION
 02555a 12/01 PREFABRICATED UNDERGROUND HEATING/COOLING DISTRIBUTION SYSTEM
 02556N 02/01 EXTERIOR BURIED PUMPED CONDENSATE RETURN
 02556a 08/01 GAS DISTRIBUTION SYSTEM
 02557N 09/99 EXTERIOR BURIED PREINSULATED WATER PIPING
 02559N 08/01 VALVE MANHOLES AND PIPING AND EQUIPMENT IN VALVE MANHOLES
 02570a 07/01 VALVE MANHOLES AND PIPING AND EQUIPMENT IN VALVE MANHOLES
 02582N 09/99 ELECTRICAL MANHOLE AND HANDHOLE
 02588N 09/99 CONCRETE POLES
 02620a 09/01 SUBDRAINAGE SYSTEM
 02621a 01/98 FOUNDATION DRAINAGE SYSTEM
 02630N 09/99 STORM DRAINAGE
 02630a 03/00 STORM-DRAINAGE SYSTEM
 02661 09/99 POND AND RESERVOIR LINERS
 02710a 12/97 BITUMINOUS-STABILIZED BASE COURSE, SUBBASE, OR SUBGRADE
 02711N 09/99 BITUMINOUS CONCRETE BASE COURSE
 02711a 03/98 PORTLAND CEMENT-STABILIZED BASE OR SUBBASE COURSE
 02712N 09/99 LEAN CONCRETE BASE COURSE
 02712a 12/97 LIME-STABILIZED BASE COURSE, SUBBASE, OR SUBGRADE
 02713N 09/99 CEMENT STABILIZED [BASE] [SUBBASE] COURSE AT AIRFIELDS AND
 ROADS
 02713a 08/97 BITUMINOUS BASE COURSE
 02714N 09/99 LIME TREATED SUBGRADE [LIME MODIFIED SOILS]
 02714a 07/01 DRAINAGE LAYER
 02721N 09/99 [BASE COURSE FOR RIGID] [AND SUBBASE COURSE FOR FLEXIBLE]
 PAVING
 02721a 03/97 SUBBASE COURSES
 02722N 09/99 GRADED CRUSHED AGGREGATE BASE COURSE FOR FLEXIBLE PAVEMENT
 02722a 05/01 AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE
 02723N 09/99 SAND-CLAY [BASE] [SUBBASE] COURSE
 02731a 01/98 AGGREGATE SURFACE COURSE
 02741N 09/99 BITUMINOUS CONCRETE PAVEMENT
 02741a 09/99 HOT-MIX ASPHALT (HMA) FOR ROADS
 02742N 09/99 HOT MIX BITUMINOUS PAVEMENT
 02742a 07/97 BITUMINOUS BINDER AND WEARING COURSES (CENTRAL-PLANT COLD-MIX)
 02743N 09/99 BITUMINOUS PRIME COAT
 02744N 09/99 BITUMINOUS TACK COAT
 02744a 07/97 BITUMINOUS ROAD-MIX SURFACE COURSE
 02745a 07/97 BITUMINOUS SURFACE TREATMENT
 02746 02/97 RESIN MODIFIED PAVEMENT SURFACING MATERIAL
 02747 01/98 POROUS FRICTION COURSE FOR AIRFIELDS AND ROADS

02748A 01/98 BITUMINOUS TACK AND PRIME COATS
 02749 10/01 HOT-MIX ASPHALT (HMA) FOR AIRFIELDS
 02751N 05/01 CONCRETE PAVEMENT FOR AIRFIELDS AND OTHER HEAVY DUTY PAVEMENTS
 02752N 09/01 PORTLAND CEMENT CONCRETE PAVEMENT FOR ROADS AND SITE FACILITIES
 02753A 01/02 CONCRETE PAVEMENT FOR AIRFIELDS AND OTHER HEAVY-DUTY PAVEMENTS
 02754a 07/01 CONCRETE PAVEMENTS FOR SMALL PROJECTS
 02755a 07/01 ROLLER COMPACTED CONCRETE (RCC) PAVEMENT
 02760a 03/97 FIELD MOLDED SEALANTS FOR SEALING JOINTS IN RIGID PAVEMENTS
 02761N 10/01 PAVEMENT MARKINGS
 02761a 12/00 FUEL-RESISTANT (COAL TAR) SEALER
 02762N 09/99 JOINTS, REINFORCEMENT, AND MOORING EYES IN CONCRETE PAVEMENTS
 02762a 11/01 COMPRESSION JOINT SEALS FOR CONCRETE PAVEMENTS
 02763a 04/01 PAVEMENT MARKINGS
 02770a 03/98 CONCRETE SIDEWALKS AND CURBS AND GUTTERS
 02780 01/98 CONCRETE BLOCK PAVEMENTS
 02785N 09/99 BITUMINOUS SEAL COAT
 02785a 07/97 BITUMINOUS SEAL COAT, SPRAY APPLICATION
 02786N 09/99 FOG SEAL
 02787 09/01 SLURRY SEAL
 02787a 04/98 BITUMINOUS REJUVENATION
 02788N 09/99 COAL TAR SEAL COAT WITH UNVULCANIZED RUBBER
 02789N 09/99 BITUMINOUS SURFACE TREATMENT
 02791 06/01 PLAYGROUND PROTECTIVE SURFACING
 02811N 08/01 IRRIGATION SPRINKLER SYSTEMS
 02811a 06/01 UNDERGROUND SPRINKLER SYSTEMS
 02821N 09/99 CHAIN LINK FENCES AND GATES
 02821a 07/01 FENCING
 02832 08/99 SEGMENTAL CONCRETE BLOCK RETAINING WALL
 02840a 04/01 ACTIVE VEHICLE BARRIERS
 02841N 08/01 TRAFFIC BARRIERS
 02870N 09/99 SITE AND STREET FURNISHINGS
 02870a 06/01 SITE FURNISHINGS
 02882 06/01 PLAYGROUND EQUIPMENT
 02915a 01/02 TRANSPLANTING EXTERIOR PLANT MATERIAL
 02921N 09/99 TURF
 02921a 01/02 SEEDING
 02922a 01/02 SODDING
 02923a 01/02 SPRIGGING
 02930N 09/00 EXTERIOR PLANTS
 02930a 01/02 EXTERIOR PLANTING
 02935N 09/99 LANDSCAPE MAINTENANCE
 02935a 01/02 EXTERIOR PLANT MATERIAL MAINTENANCE
 02951A 08/97 RUNWAY RUBBER REMOVAL
 02961N 03/98 COLD-MILLING OF BITUMINOUS PAVEMENT
 02964a 03/98 COLD MILLING OF BITUMINOUS PAVEMENTS
 02965a 08/97 COLD-MIX RECYCLING
 02966a 08/97 HOT IN-PLACE RECYCLING OF BITUMINOUS PAVEMENTS
 02967a 04/01 HEATER SCARIFYING OF BITUMINOUS PAVEMENTS
 02975a 07/97 SEALING OF CRACKS IN BITUMINOUS PAVEMENTS
 02976N 09/99 STRESS-ABSORBING MEMBRANE INTERLAYER
 02980a 08/97 PATCHING OF RIGID PAVEMENTS
 02981A 11/97 GROOVING FOR AIRFIELD PAVEMENTS
 02981N 09/99 RUBBER AND PAINT REMOVAL FROM AIRFIELD PAVEMENTS
 02982N 09/99 RESEALING OF JOINTS IN RIGID PAVEMENT
 02983N 09/99 PARTIAL DEPTH PATCHING OF RIGID PAVEMENT
 02985a 12/97 SLABJACKING RIGID PAVEMENTS

DIVISION 03 - CONCRETE

03100a 05/98 STRUCTURAL CONCRETE FORMWORK
 03101a 09/01 FORMWORK FOR CONCRETE
 03150a 05/98 EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS
 03151a 09/01 EXPANSION, CONTRACTION AND CONSTRUCTION JOINTS IN CONCRETE FOR CIVIL WORKS
 03200a 09/97 CONCRETE REINFORCEMENT
 03201 10/01 STEEL BARS AND WELDED WIRE FABRIC FOR CONCRETE REINFORCEMENT FOR CIVIL WORKS
 03230 09/01 STEEL STRESSING TENDONS AND ACCESSORIES FOR PRESTRESSED CONCRETE
 03300 11/01 CAST-IN-PLACE STRUCTURAL CONCRETE
 03300N 12/01 CAST-IN-PLACE CONCRETE
 03301a 09/01 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS
 03307a 11/01 CONCRETE FOR MINOR STRUCTURES
 03311 09/99 MARINE CONCRETE
 03330a 03/89 CAST-IN-PLACE ARCHITECTURAL CONCRETE
 03340a 06/97 ROOF DECKING, CAST-IN-PLACE LOW DENSITY CONCRETE
 03371 09/01 SHOTCRETE
 03372 09/01 PREPLACED-AGGREGATE CONCRETE
 03373 09/01 CONCRETE FOR CONCRETE CUTOFF WALLS
 03410N 03/00 PLANT-PRECAST STRUCTURAL CONCRETE
 03410a 05/98 PRECAST/PRESTRESSED CONCRETE FLOOR AND ROOF UNITS
 03412N 09/99 PLANT-PRECAST PRESTRESSED STRUCTURAL CONCRETE
 03413a 05/98 PRECAST ARCHITECTURAL CONCRETE
 03414a 03/89 PRECAST ROOF DECKING
 03415a 09/01 PRECAST-PRESTRESSED CONCRETE
 03450 09/99 PLANT-PRECAST ARCHITECTURAL CONCRETE
 03511a 09/96 GYPSUM PLANK DECKING (CONTRACTOR'S OPTION)
 03520N 09/99 LIGHTWEIGHT CONCRETE ROOF INSULATION
 03700 07/92 MASS CONCRETE
 03701 10/01 ROLLER-COMPACTED CONCRETE FOR MASS CONCRETE CONSTRUCTION
 03900 12/97 RESTORATION OF CONCRETE IN HISTORIC STRUCTURES
 03930 09/99 CONCRETE REHABILITATION

DIVISION 04 - MASONRY

04200N 09/99 UNIT MASONRY
 04200a 10/01 MASONRY
 04220a 01/02 NONBEARING MASONRY VENEER/STEEL STUD WALLS
 04230N 09/99 REINFORCED MASONRY
 04250N 09/99 GLAZED STRUCTURAL CLAY TILE AND PREFACED CONCRETE MASONRY UNITS
 04270N 09/99 GLASS MASONRY UNITS
 04900 05/97 RESTORATION AND CLEANING OF MASONRY IN HISTORIC STRUCTURES

DIVISION 05 - METALS

05055a 12/92 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS
 05090a 09/98 WELDING, STRUCTURAL
 05091a 09/98 ULTRASONIC INSPECTION OF WELDMENTS
 05092a 09/98 ULTRASONIC INSPECTION OF PLATES
 05093a 09/98 WELDING PRESSURE PIPING
 05120N 01/01 STRUCTURAL STEEL
 05120a 01/02 STRUCTURAL STEEL
 05210N 09/00 STEEL JOISTS [AND JOIST GIRDERS]
 05210a 01/02 STEEL JOISTS
 05300a 01/02 STEEL DECKING
 05310N 09/99 STEEL DECKS
 05400N 09/99 COLD-FORMED METAL FRAMING
 05400a 01/02 COLD-FORMED STEEL FRAMING

05500N 09/99 METAL FABRICATIONS
 05500a 01/02 MISCELLANEOUS METAL
 05502a 05/92 METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED
 ITEMS
 05615a 04/93 STOPLOGS
 05650N 08/01 RAILROAD TRACK AND ACCESSORIES
 05650a 05/01 RAILROADS
 05652N 09/99 WELDING CRANE AND RAILROAD RAIL - THERMITE METHOD

DIVISION 06 - WOODS & PLASTICS

06100N 09/99 ROUGH CARPENTRY
 06100a 10/01 ROUGH CARPENTRY
 06200N 09/99 FINISH CARPENTRY
 06200a 11/01 FINISH CARPENTRY
 06410a 11/01 LAMINATE CLAD ARCHITECTURAL CASEWORK
 06650 10/00 SOLID POLYMER (SOLID SURFACING) FABRICATIONS
 06650N 09/99 SOLID POLYMER FABRICATIONS

DIVISION 07 - THERMAL & MOISTURE PROTECTION

07110a 09/98 BITUMINOUS DAMPPROOFING
 07112N 09/99 BITUMINOUS DAMPPROOFING
 07121N 09/99 BUILT-UP BITUMINOUS WATERPROOFING
 07131a 09/98 ELASTOMERIC MEMBRANE WATERPROOFING
 07132N 09/01 ELASTOMERIC SHEET WATERPROOFING
 07132a 09/98 BITUMINOUS WATERPROOFING
 07141N 09/99 FLUID-APPLIED WATERPROOFING
 07161N 09/99 METALLIC OXIDE WATERPROOFING
 07170N 09/99 BENTONITE WATERPROOFING
 07190N 09/99 WATER REPELLENTS
 07212N 09/99 MINERAL FIBER BLANKET INSULATION
 07214N 09/99 BOARD AND BLOCK INSULATION
 07216N 09/00 LOOSE FILL THERMAL INSULATION
 07220N 03/00 ROOF AND DECK INSULATION
 07220a 10/01 ROOF INSULATION
 07240 10/01 EXTERIOR INSULATION AND FINISH SYSTEMS
 07310 02/95 SLATE ROOFING
 07311N 09/99 ASPHALT SHINGLES
 07311a 08/98 ROOFING, STRIP SHINGLES
 07320N 09/99 ROOF TILES
 07320a 02/95 CLAY TILE ROOFING
 07410N 09/99 METAL ROOF AND WALL PANELS
 07412a 10/01 NON-STRUCTURAL METAL ROOFING
 07413a 10/01 METAL SIDING
 07416a 11/01 STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM
 07510a 10/01 BUILT-UP ROOFING
 07511N 09/99 BUILT-UP ASPHALT ROOFING (AGGREGATE SURFACED)
 07512N 09/99 BUILT-UP ASPHALT ROOFING (SMOOTH SURFACED)
 07513N 09/99 BUILT-UP ASPHALT ROOFING (MINERAL SURFACED)
 07515a 01/02 PROTECTED MEMBRANE ROOFING (PMR)
 07530a 09/95 ELASTOMERIC ROOFING (EPDM)
 07531N 09/99 CHLOROSULFONATED POLYETHYLENE ROOFING (CSPE)
 07532N 09/99 POLYISOBUTYLENE (PIB) ROOFING
 07536N 09/99 ETHYLENE PROPYLENE DIENE MONOMER (EPDM) ROOFING
 07541N 09/99 POLYVINYL CHLORIDE (PVC) ROOFING
 07542N 09/99 THERMOPLASTIC ALLOY (TPA) ROOFING
 07548a 08/97 POLYVINYL CHLORIDE (PVC) ROOFING
 07550N 09/99 MODIFIED BITUMINOUS MEMBRANE ROOFING

07551a 01/02 MODIFIED BITUMEN ROOFING
 07570a 11/01 SPRAYED POLYURETHANE FOAM (SPF) ROOFING
 07571N 09/99 FOAMED ROOFING
 07572N 09/99 COATINGS FOR FOAMED ROOFING
 07580N 09/99 ROLL ROOFING
 07600N 09/99 FLASHING AND SHEET METAL
 07600a 11/01 SHEET METALWORK, GENERAL
 07610 08/94 COPPER ROOF SYSTEM
 07611N 09/99 STEEL STANDING SEAM ROOFING
 07612N 09/99 ALUMINUM STANDING SEAM ROOFING
 07620a 08/99 MESH TERMITE BARRIER
 07625a 05/01 COPPER SHEET METAL FLASHING
 07720A 04/00 ROOF VENTILATORS, GRAVITY-TYPE
 07810N 09/99 SPRAY-APPLIED FIREPROOFING
 07810a 07/01 SPRAY-APPLIED FIREPROOFING
 07840N 09/99 FIRESTOPPING
 07840a 08/00 FIRESTOPPING
 07900a 06/97 JOINT SEALING
 07920N 09/99 JOINT SEALANTS

DIVISION 08 - DOORS & WINDOWS

08110 05/01 STEEL DOORS AND FRAMES
 08120 09/99 ALUMINUM DOORS AND FRAMES
 08161 08/01 ALUMINUM SLIDING GLASS DOORS
 08162 08/01 SLIDING FIRE DOORS
 08165a 11/01 SLIDING METAL DOORS
 08181 08/01 METAL STORM DOORS
 08210 09/99 WOOD DOORS
 08302N 08/01 CORROSION CONTROL HANGAR DOORS
 08315N 09/01 BLAST RESISTANT DOORS (OVAL ARCH MAGAZINES)
 08330a 06/97 OVERHEAD ROLLING DOORS
 08331N 08/01 ROLLING SERVICE [AND FIRE] DOORS
 08331a 09/98 METAL ROLLING COUNTER DOORS
 08342 03/01 STEEL SLIDING HANGAR DOORS
 08361 08/01 SECTIONAL OVERHEAD DOORS
 08370 08/01 VERTICAL LIFT DOORS
 08390 04/01 BLAST RESISTANT DOORS
 08510 08/01 STEEL WINDOWS
 08520N 08/01 ALUMINUM WINDOWS
 08520a 03/00 ALUMINUM AND ENVIRONMENTAL CONTROL ALUMINUM WINDOWS
 08550 08/01 WOOD WINDOWS
 08560 08/01 PLASTIC WINDOWS
 08581 08/01 BLAST RESISTANT TEMPERED GLASS WINDOWS
 08582 08/01 ALUMINUM STORM WINDOWS
 08590 08/97 WOOD WINDOWS - REPAIR AND REHABILITATION
 08600 08/00 SKYLIGHTS
 08710 08/01 DOOR HARDWARE
 08745 08/01 ELECTRICAL LOCKING CONTROL FOR BRIGS
 08800N 09/99 GLAZING
 08810a 05/97 GLASS AND GLAZING
 08840a 07/95 PLASTIC GLAZING
 08850 07/92 FRAGMENT RETENTION FILM FOR GLASS
 08900 09/99 GLAZED CURTAIN WALL

DIVISION 09 - FINISHES

09100N 09/99 METAL SUPPORT ASSEMBLIES
 09200a 06/97 LATHING AND PLASTERING

09205N 09/99 FURRING AND LATHING
 09212N 09/00 GYPSUM PLASTER, CEMENT PLASTER, AND STUCCO
 09215N 09/99 VENEER PLASTER
 09215a 11/95 VENEER PLASTER
 09225A 11/95 STUCCO
 09250 11/01 GYPSUM BOARD
 09310A 11/01 CERAMIC TILE
 09310N 09/99 CERAMIC TILE, QUARRY TILE, AND PAVER TILE
 09331N 09/99 CHEMICAL-RESISTANT QUARRY TILE
 09410N 09/99 PORTLAND CEMENT TERRAZZO
 09411A 01/96 BONDED TERRAZZO
 09421A 11/95 TERRAZZO TILE
 09445A 01/96 RESINOUS TERRAZZO FLOORING
 09510A 10/01 ACOUSTICAL CEILINGS
 09510N 09/99 ACOUSTICAL CEILINGS
 09611N 03/01 THIN FILM FLOORING SYSTEM FOR AIRCRAFT MAINTENANCE FACILITIES
 09612N 03/01 EPOXY MORTAR FLOORING SYSTEM FOR AIRCRAFT MAINTENANCE
 FACILITIES
 09620A 01/98 RESILIENT ATHLETIC FLOORING
 09640A 11/01 WOOD STRIP FLOORING
 09641A 04/01 HARDWOOD PARQUET FLOORING
 09641N 08/01 WOOD ATHLETIC FLOORING
 09643N 08/01 PORTABLE (DEMOUNTABLE) WOOD FLOORING
 09645N 08/01 WOOD PARQUET FLOORING
 09650A 07/96 RESILIENT FLOORING
 09651N 08/01 RESILIENT TILE FLOORING
 09655N 08/01 RESILIENT SHEET FLOORING
 09656N 08/01 RESILIENT SHEET FLOORING (INSTITUTIONAL)
 09660A 01/98 CONDUCTIVE VINYL FLOORING
 09670A 04/01 INDUSTRIAL RESIN-BASED FLOORING
 09670N 08/01 FLUID-APPLIED FLOORING
 09680A 05/01 CARPET
 09680N 08/01 CARPET
 09685N 08/01 CARPET TILE
 09720A 04/01 WALLCOVERINGS
 09721N 08/01 VINYL COATED FABRIC WALL COVERING
 09840A 11/01 ACOUSTICAL WALL TREATMENT
 09900 09/01 PAINTS AND COATINGS
 09910N 03/00 MAINTENANCE, REPAIR, AND COATING OF TALL ANTENNA TOWERS
 09915 06/93 COLOR SCHEDULE
 09963N 09/99 HIGH-BUILD GLAZE COATINGS
 09965A 04/01 PAINTING: HYDRAULIC STRUCTURES
 09965N 08/01 METALLIC TYPE CONDUCTIVE/SPARK RESISTANT CONCRETE FLOOR FINISH
 09967N 09/99 COATING OF STEEL WATERFRONT STRUCTURES
 09970N 09/01 INTERIOR COATING OF WELDED STEEL PETROLEUM FUEL TANKS
 09971 09/01 EXTERIOR COATING OF STEEL STRUCTURES
 09971A 10/00 METALLIZING: HYDRAULIC STRUCTURES
 09972 09/01 INTERIOR COATING OF WELDED STEEL WATER TANKS
 09973 09/01 INTERIOR COATING OF WELDED STEEL PETROLEUM FUEL TANKS
 09974N 09/00 PROTECTION OF BURIED STEEL PIPING AND STEEL BULKHEAD TIE RODS
 09980N 09/99 INTERIOR LINING FOR CONCRETE STORAGE TANKS (FOR PETROLEUM
 FUELS)
 09981N 09/98 LINSEED OIL PROTECTION OF CONCRETE SURFACES
 09995 01/98 PREPARATION OF HISTORIC WOOD AND METAL SURFACES FOR PAINTING

DIVISION 10 - SPECIALTIES

10100A 11/00 VISUAL COMMUNICATIONS SPECIALTIES
 10153N 09/99 TOILET PARTITIONS

10160A 07/98 TOILET PARTITIONS
 10191N 08/01 CUBICLE TRACK AND HARDWARE
 10201N 09/99 METAL [WALL] [AND] [DOOR] LOUVERS
 10260A 12/95 WALL AND CORNER PROTECTION
 10260N 09/99 WALL AND CORNER GUARDS
 10270A 01/97 RAISED FLOOR SYSTEM
 10270N 09/99 ACCESS FLOORING
 10400N 09/99 IDENTIFICATION DEVICES
 10430A 06/01 EXTERIOR SIGNAGE
 10440A 06/01 INTERIOR SIGNAGE
 10505N 09/99 STEEL CLOTHING LOCKERS
 10605N 09/99 WIRE MESH PARTITIONS
 10615A 08/00 DEMOUNTABLE PARTITIONS
 10650A 08/00 OPERABLE PARTITIONS
 10652N 08/01 OPERABLE PANEL PARTITIONS
 10655N 08/01 ACCORDION FOLDING PARTITIONS
 10675N 09/99 STEEL SHELVING
 10716N 08/01 STORM SHUTTERS
 10800A 04/01 TOILET ACCESSORIES
 10800N 09/99 TOILET AND BATH ACCESSORIES

DIVISION 11 - EQUIPMENT

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 11020N 09/99 SECURITY VAULT DOOR [AND DAY GATE]
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PART B

UNEDITED OMAHA DISTRICT GUIDE

SPECIFICATIONS

Part B addresses unedited Omaha District guide specifications required by the RFP. The Contractor is required to edit and incorporate the sections listed below for the 100% Design. These Sections will be made available to the awarded Contractor in electronic form (Specintact). They are presented here in hardcopy form for the Proposer's viewing, since they are not available on a particular website .

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SECTION 01356

STORM WATER POLLUTION PREVENTION MEASURES
11/01

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 448 (1998) Sizes of Aggregate for Road and Bridge Construction

ASTM D 4873 (2001) Identification, Storage, and Handling of Geosynthetic Rolls and Samples

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 288 (2000) Geotextile for Highway Applications

1.2 GENERAL

The Contractor shall implement the storm water pollution prevention measures specified in this section in a manner which will meet the requirements of Section 01355 ENVIRONMENTAL PROTECTION, and the requirements of the National Pollution Discharge Elimination System (NPDES) permit specified in Section 01565 (FEDERAL FACILITIES COLORADO) NPDES PERMIT REQUIREMENTS FOR STORM WATER DISCHARGES FROM CONSTRUCTION SITES.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-07 Certificates

Mill Certificate or Affidavit

1.4 EROSION AND SEDIMENT CONTROLS

The controls and measures required by the Contractor are described in the Storm Water Pollution Prevention Plans (SWPPP) and to Section 01565 (FEDERAL FACILITIES COLORADO) NPDES PERMIT REQUIREMENTS FOR STORM WATER DISCHARGES FROM CONSTRUCTION SITES.

PART 2 PRODUCTS

2.1 COMPONENTS FOR SILT FENCES

2.1.1 Geotextile

The geotextile shall comply with the requirements of AASHTO M 288 for temporary silt fence.

2.1.2 Silt Fence Stakes and Posts

The Contractor may use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 50 mm by 50 mm when oak is used and 100 mm by 100 mm when pine is used, and shall have a minimum length of 0.9 m. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum mass of 1.98 kg per linear meter and a minimum length of 1.5 m.

2.1.3 Mill Certificate or Affidavit

A mill certificate or affidavit shall be provided attesting that the geotextile and factory seams meet chemical, physical, and manufacturing requirements specified above. The mill certificate or affidavit shall specify the actual Minimum Average Roll Values and shall identify the fabric supplied by roll identification numbers. The Contractor shall submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the geotextile.

2.1.4 Identification Storage and Handling

Geotextile shall be identified, stored and handled in accordance with ASTM D 4873.

2.1.5 Support Mesh

Support mesh shall be 14-1/2 gage or heavier steel wire with a mesh spacing of 150 by 150 mm or a prefabricated polymeric mesh of equivalent strength.

2.2 Erosion Control Blankets

Erosion control blankets shall be a machine-produced mat with a biodegradable agricultural straw matrix (approximately 0.27 kg/sq m) and photodegradable netting on each side. The blanket shall be sewn together with degradable thread. Installation staple patterns shall be clearly marked on the erosion control blanket with environmentally safe paint.

2.3 COMPONENTS FOR SEDIMENT TRAP

Coarse aggregate shall conform to ASTM D 448, Size 3, 357, or 5. Minor variations from the gradations specified will be permitted. Stone for riprap shall consist of field stone or rough unhewn quarry stone of approximately rectangular shape. The stone shall be hard and angular and of such quality that it will not disintegrate on exposure to water or weathering. The specific gravity of individual stones shall be at least 2.5. Riprap stones shall weigh between 23 and 68 kg each, except that approximately 10 percent may weigh 23 kg or less. At least 60 percent shall weigh more than 45 kg. Geotextile shall conform to paragraph GEOTEXTILES.

2.4 COMPONENTS FOR INLET PROTECTION

Aggregates for gravel filter should be sized to get the greatest amount of filtering action possible (by using smaller-sized stone), while not creating significant ponding problems.

2.5 STONE CONSTRUCTION ENTRANCE

Aggregate for construction entrance shall conform to ASTM D 448, Size 1. Minor variations from the gradation specified will be permitted. Geotextile shall conform to paragraph GEOTEXTILES.

2.6 ROCK CHECK DAMS

Coarse aggregate shall conform to ASTM D 448 size number 1 or approved equal. Riprap shall consist of field stone or rough unhewn quarry stone of approximately rectangular shape. Riprap shall be hard and angular. The specific gravity of individual stones shall be at least 2.5. Concrete rubble may be used provided it has a density of at least . Individual stones shall have a weight of 23 kg to 68 kg except that a maximum of 10 percent of stone may weigh less than 50 lbs. At least 60 percent of stones shall weigh more than 45 kg.

2.7 GEOTEXTILES

Geotextile for other than silt fence shall comply with the requirements of AASHTO M 288 for a separation geotextile.

PART 3 EXECUTION

3.1 INSTALLATION OF SILT FENCES

Silt fences shall extend a minimum of 400 mm above the ground surface and shall not exceed 860 mm above the ground surface. Filter fabric shall be from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, filter fabric shall be spliced together at a support post, with a minimum 150 mm overlap, and securely sealed. A trench shall be excavated approximately 150 mm wide and 200 mm deep on the upslope side of the location of the silt fence. The 150 mm by 200 mm trench shall be backfilled and the soil compacted over the filter fabric. Silt fences shall be removed upon approval by the Contracting Officer.

3.2 Sediment Trap

The area under the embankment shall be cleared, grubbed, and stripped of any vegetation and root mat. Fill material for the embankment shall be placed in accordance with Section 02300 EARTHWORK. A geotextile shall be placed between the riprap and subgrade.

3.3 Stone Construction Entrance

The area of the entrance shall be cleared of all vegetation, roots, and other objectionable material. The aggregate layer shall have a minimum total thickness of 150 mm. A geotextile shall be placed beneath aggregate for the full width and length of the entrance. A minimum of 75 mm of the aggregate shall be placed in a cut section to provide stability and secure the geotextile. If conditions on the site are such that the majority of the mud is not removed by the vehicles traveling over the stone, then the tires of the vehicles shall be washed before entering the road. Wash water

must be carried away from the entrance to an approved settling area to remove sediment. A wash rack may also be installed for washing of vehicles.

3.4 MAINTENANCE

The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. Maintenance of protective measures shall conform to the requirements in the SWPPP.

3.5 INSPECTIONS

3.5.1 General

The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any storm that produces 13 mm or more rainfall at the site. Where sites have been finally stabilized, such inspection shall be conducted at least once every month. Inspection of protective measures shall conform to the requirements in the SWPPP.

3.5.2 Inspections Details

Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.

3.5.3 Inspection Reports

For each inspection conducted, the Contractor shall prepare a report summarizing the scope of the inspection, name(s) of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the storm water pollution prevention measures, maintenance performed, and actions taken. The report shall be furnished to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT.

-- End of Section --

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SECTION 01565

(FEDERAL FACILITIES COLORADO) NPDES PERMIT REQUIREMENTS FOR STORM WATER
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03/01

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SECTION 01565

(FEDERAL FACILITIES COLORADO) NPDES PERMIT REQUIREMENTS
FOR STORM WATER DISCHARGES
FROM CONSTRUCTION SITES
03/01

Attachments: Endangered Species/Critical Habitat Letter of Determination
Storm Water General Permit For Construction Activities
Notice of Intent
Notice of Termination

PART 1 GENERAL

1.1 REFERENCES (Not Applicable)

1.2 SUBMITTALS (Not Applicable)

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall be responsible for implementing the terms and requirements of the attached Storm Water General Permit For Construction Activities (Permit No. COR10*##F) as specified below. The Government and the Contractor shall be considered co-permittees. The Government has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications. The Contractor shall have day-to-day operational control of those activities which are necessary to ensure compliance with the requirements specified herein. The Government shall be responsible for all submissions to the EPA. The Government shall retain the official copy of all documents pertaining to compliance with the permit during construction. The project site is not located in designated critical habitat and there are no known "listed species" located in the project area.

3.2 IMPLEMENTATION

3.2.1 Notice of Intent

The Contractor shall complete and sign a Notice of Intent (NOI) in accordance with NPDES Permit No. COR10*##F. The Contractor's NOI shall be furnished to the Contracting Officer at least 7 calendar days prior to the commencement of construction activities. The Government shall submit the Contractor's and Government's NOI's to the EPA. The Government will not submit the NOI's to the EPA until the Storm Water Pollution Prevention Plan has been accepted. The Contractor may not begin land disturbance activities until authorized by the Contracting Officer. The Status of Owner/Operator shall be "F" for both the Contractor and the Government. The Contractor shall check the box marked (d) concerning eligibility with regard to protection of endangered species.

3.2.2 Storm Water Pollution Prevention Plan

3.2.2.1 General

The Contractor shall be responsible for preparing the Storm Water Pollution Prevention Plan (SWPPP). The Contractor shall be responsible for implementing, maintaining and updating the SWPPP (including Site Map) during construction. Unless otherwise indicated, the Contractor shall be responsible for implementing all measures described in the SWPPP. The Contractor shall maintain the following records and attach to the SWPPP: the dates when major grading activities occur; the dates when construction activities temporarily or permanently cease on a portion of the site; and the dates when stabilization measures are initiated. The Government shall keep the official plan at the site. The SWPPP shall be signed by the Government and the Contractor. If major changes to the SWPPP are required during construction, the SWPPP shall be recertified by the Government and the Contractor.

3.2.2.2 Acceptance of SWPPP

Acceptance of the SWPPP is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes to the SWPPP if the Contracting Officer determines that environmental protection requirements are not being met.

3.2.2.3 Notification of Changes

After acceptance of the SWPPP, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.2.3 Posting Notice

The Contractor shall indicate the NPDES permit number, name and telephone number of a local contact person, and a brief description of the project near the main entrance of the construction site in accordance with Part IV.B.2 of the general permit.

3.2.4 Inspections and Reporting

The Contractor shall be responsible for all inspections specified in the SWPPP and the general permit. The Contractor shall also prepare and sign all reports summarizing the inspections as required by the SWPPP and the general permit. Copies of inspection reports shall be furnished to the Contracting Officer for attachment to the SWPPP no more than 2 days after each inspection. The Contractor shall notify the Contracting Officer within 24 hours if an inspection identifies any incidents of non-compliance with the SWPPP and the general permit.

3.2.5 Maintenance

The Contractor shall be responsible for maintaining all erosion and sediment control measures and other protective measures identified in the SWPPP in an effective operating condition. The Government reserves the right to require the Contractor to perform maintenance on erosion and sediment control measures and other protective measures if the Contracting Officer determines that environmental protection requirements are not being met.

3.2.6 Notice of Termination

The Contractor shall notify the Contracting Officer within 24 hours after final stabilization on all portions of the site has been achieved in accordance with Part I.D.2. of the permit. The Contractor shall complete and sign a Notice of Termination (NOT) in accordance with NPDES Permit No. COR10*##F. The Contractor's NOT shall be furnished to the Contracting Officer within 5 calendar days after final stabilization (as defined in the permit) has been achieved on all portions of the site. The Government shall submit the Contractor's and Government's NOTs to the EPA.

3.2.7 Retention of Records

The Government shall be responsible for retaining copies of the SWPPP and all reports in accordance with NPDES Permit No. COR10*##F.

3.2.8 Continuation of Expired Permit

If the current NPDES general permit expires prior to completion of construction, the Contractor shall comply with the conditions of the new permit.

-- End of Section --

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18TH STREET, SUITE 500
DENVER, COLORADO 80202-2466

STORM WATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITIES

For Federal Facilities in the State of Colorado, except those located on Indian Country Lands

**AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM**

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et. seq.), except as provided in Part I.B.3 of this permit, operators of construction activities located in an area specified in Part I.A. and who submit a Notice of Intent in accordance with Part II, are authorized to discharge pollutants to waters of the United States in accordance with the conditions and requirements set forth herein.

This permit shall become effective on February 17, 1998

This permit and the authorization to discharge shall expire at midnight, February 17, 2003

Signed and issued this 15th day of January, 1998


Authorized Permitting Official

Kerrigan G. Clough, Assistant Regional Administrator
Office of Pollution Prevention, State and Tribal Assistance
Title

NOTE-THIS PAGE WILL BE REPLACED BY COPY OF SIGNED PAGE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII

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Office of Pollution Prevention, State and Tribal Assistance

Title

**NPDES GENERAL PERMIT FOR STORM WATER
DISCHARGES FROM CONSTRUCTION ACTIVITIES**

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Preface

EPA's reissued construction general permits (CGP) were published in the Federal Register on February 17, 1998 (see 63 FR 7857). That document included the conditions for 38 separate permits involving 7 different Regions of EPA. Seven of those permits involve EPA Region VIII and this permit is one of them. In order to make this permit easier to read and understand, it has been reformatted from the style used in the Federal Register and limited to conditions and information that only apply to the area covered by this permit. References, conditions and information pertaining to all other Regions, States and Tribes that were included in the Federal Register, but not applicable to the areas covered by this permit, were removed. The conditions in this permit mimic the permits published in the Federal Register in all other ways. Persons that want CGP information for areas not covered by this permit should refer to the February 17, 1998 Federal Register or one of the other permits prepared by EPA Region VIII.

Part I. COVERAGE UNDER THIS PERMIT

A. Permit Area.

Federal Facilities in the State of Colorado, except those located on Indian Country lands.

B. Eligibility.

1. Permittees are authorized to discharge pollutants in storm water runoff associated with construction activities as defined in 40 CFR 122.26(b)(14)(x) and those construction site discharges designated by the Director as needing a storm water permit under 122.26(a)(1)(v) or under 122.26(a)(9) and 122.26(g)(1)(i). Discharges identified under Part I.B.3 are excluded from coverage. Any discharge authorized by a different NPDES permit may be commingled with discharges authorized by this permit.
2. This permit also authorizes storm water discharges from support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided:
 - a. the support activity is directly related to a construction site that is required to have NPDES permit coverage for discharges of storm water associated with construction activity;
 - b. the support activity is not a commercial operation serving multiple unrelated construction projects by different operators, and does not operate beyond the completion of the construction activity at the last construction project it supports; and
 - c. appropriate controls and measures are identified in a storm water pollution prevention plan covering the discharges from the support activity areas.

3. Limitations on Coverage.

- a. Post Construction Discharges. This permit does not authorize storm water discharges that originate from the site after construction activities have been completed and the site, including any temporary support activity site, has undergone final stabilization. Industrial post-construction storm water discharges may need to be covered by a separate NPDES permit.
- b. Discharges Mixed with Non-Storm Water. This permit does not authorize discharges that are mixed with sources of non-storm water, other than those discharges which are identified in Part III.A.2. or 3. (exceptions to prohibition on non-storm water discharges) and are in compliance with Part IV.D.5 (non-storm water discharges).
- c. Discharges Covered by Another Permit. This permit does not authorize storm water discharges associated with construction activity that have been covered under an individual permit or required to obtain coverage under an alternative general permit in accordance with Part VI.L.
- d. Discharges Threatening Water Quality. This permit does not authorize storm water discharges from construction sites that the Director (EPA) determines will cause, or have reasonable potential to cause or contribute to, violations of water quality standards. Where such determinations have been made, the Director may notify the operator(s) that an individual permit application is necessary in accordance with Part VI.L. However, the Director may authorize coverage under this permit after appropriate controls and implementation procedures designed to bring the discharges into compliance with water quality standards have been included in the storm water pollution prevention plan;
- e. Storm water discharges and storm water discharge-related activities that are not protective of Federally listed endangered and threatened ("listed") species or designated critical habitat ("critical habitat").
 - (1) For the purposes of complying with the Part I.B.3.e. eligibility requirements, "storm water discharge-related activities" include:
 - (a) activities which cause, contribute to, or result in point source storm water pollutant discharges, including but not limited to: excavation, site development, grading and other surface disturbance activities; and
 - (b) measures to control storm water including the siting, construction and operation of best management practices (BMPs) to control, reduce or prevent storm water pollution.
 - (2) Coverage under this permit is available only if the applicant certifies that it meets at least one of the criteria in paragraphs (a)-(d) below. Failure to continue to meet one of these criteria during the term of the permit will render a permittee ineligible for coverage under this permit.
 - (a) The storm water discharges and storm water discharge-related activities are not likely to adversely affect listed species or critical habitat; or
 - (b) Formal or informal consultation with the Fish and Wildlife Service and/or the National Marine Fisheries Service (the "Services") under section 7 of the Endangered Species Act (ESA) has been concluded which addresses the effects of the applicant's storm water discharges and storm water discharge-related activities on listed species and critical

3. Limitations on Coverage. (Continued)

habitat and the consultation results in either a no jeopardy opinion or a written concurrence by the Service(s) on a finding that the applicant's storm water discharges and storm water discharge-related activities are not likely to adversely affect listed species or critical habitat. A section 7 consultation may occur in the context of another Federal action (e.g., a ESA section 7 consultation was performed for issuance of a wetlands dredge and fill permit for the project, or as part of a National Environmental Policy Act (NEPA) review); or

- (c) The applicant's construction activities are authorized under section 10 of the ESA and that authorization addresses the effects of the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat; or
 - (d) The applicant's storm water discharges and storm water discharge-related activities were already addressed in another operator's certification of eligibility under Part I.B.3.e.(2)(a), (b), or (c) which included the applicant's project area. By certifying eligibility under Part I.B.3.e.(2)(d), the applicant agrees to comply with any measures or controls upon which the other operator's certification under Part I.B.3.e.(2)(a), (b) or (c) was based.
- (3) All applicants must follow the procedures provided at Addendum A of this permit when applying for permit coverage.
 - (4) The applicant must comply with any applicable terms, conditions or other requirements developed in the process of meeting eligibility requirements of Part I.B.3.e.(2)(a), (b), (c), or (d) above to remain eligible for coverage under this permit. Such terms and conditions must be incorporated in the applicant's storm water pollution prevention plan.
 - (5) Applicants who choose to conduct informal consultation to meet the eligibility requirements of Part I.B.3.e.(2)(b) are automatically designated as non-Federal representatives under this permit. See 50 CFR 402.08. Applicants who choose to conduct informal consultation as a non-Federal representatives must notify EPA and the appropriate Service office in writing of that decision.
 - (6) This permit does not authorize any storm water discharges where the discharges or storm water discharge-related activities cause prohibited "take" (as defined under section 3 of the Endangered Species Act and 50 CFR 17.3) of endangered or threatened species unless such takes are authorized under sections 7 or 10 of the Endangered Species Act.
 - (7) This permit does not authorize any storm water discharges where the discharges or storm water discharge-related activities are likely to jeopardize the continued existence of any species that are listed or proposed to be listed as endangered or threatened under the ESA or result in the adverse modification or destruction of habitat that is designated or proposed to be designated as critical under the ESA.
- f. Storm water Discharges and Storm Water Discharge-Related Activities with Unconsidered Adverse Effects on Historic Properties. (Reserved)

C. Obtaining Authorization.

1. In order for storm water discharges from construction activities to be authorized under this general permit, an operator must:
 - a. meet the Part I.B eligibility requirements;
 - b. except as provided in Parts II.A.5 and II.A.6, develop a storm water pollution prevention plan (SWPPP) covering either the entire site or all portions of the site for which they are operators (see definition in Part IX.N) according to the requirements in Part IV. A "joint" SWPPP may be developed and implemented as a cooperative effort where there is more than one operator at a site; and
 - c. submit a Notice of Intent (NOI) in accordance with the requirements of Part II, using an NOI form provided by the Director (or a photocopy thereof, see Addendum C, page 45). Only one NOI need be submitted to cover all of the permittee's activities on the common plan of development or sale (e.g., you do not need to submit a separate NOI for each separate lot in a residential subdivision or for two separate buildings being constructed at a manufacturing facility, provided your SWPPP covers each area for which you are an operator). The SWPPP must be implemented upon commencement of construction activities.
2. Any new operator on site, including those who replace an operator who has previously obtained permit coverage, must submit an NOI to obtain permit coverage.
3. Unless notified by the Director to the contrary, operators who submit a correctly completed NOI in accordance with the requirements of this permit are authorized to discharge storm water from construction activities under the terms and conditions of this permit two (2) days after the date that the NOI is postmarked. The Director may deny coverage under this permit and require submittal of an application for an individual NPDES permit based on a review of the NOI or other information (see Part VI.L).

D. Terminating Coverage.

1. Permittees wishing to terminate coverage under this permit must submit a Notice of Termination (NOT) in accordance with Part VIII of this permit (see Addendum D, page 47). Compliance with this permit is required until an NOT is submitted. The permittee's authorization to discharge under this permit terminates at midnight of the day the NOT is signed.
2. All permittees must submit an NOT within thirty (30) days after one or more of the following conditions have been met:
 - a. final stabilization (see definition Part IX.I) has been achieved on all portions of the site for which the permittee is responsible (including if applicable, returning agricultural land to its pre-construction agricultural use);
 - b. another operator/permittee has assumed control according to Part VI.G.2.c. over all areas of the site that have not been finally stabilized; or

D. Terminating Coverage. (Continued)

- c. for residential construction only, temporary stabilization has been completed and the residence has been transferred to the homeowner.

Enforcement actions may be taken if a permittee submits an NOT without meeting one or more of these conditions.

Part II. NOTICE OF INTENT REQUIREMENTS

A. Deadlines for Notification.

1. Except as provided in Parts II.A.3, II.A.4, II.A.5 or II.A.6 below, parties defined as operators (see definition in Part IX.N) due to their operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications, must submit a Notice of Intent (NOI) in accordance with the requirements of this Part at least two (2) days prior to the commencement of construction activities (i.e., the initial disturbance of soils associated with clearing, grading, excavation activities, or other construction activities).
2. Except as provided in Parts II.A.3, II.A.4, II.A.5 or II.A.6 below, parties defined as operators (see definition in Part IX.N) due to their day-to-day operational control over activities at a project which are necessary to ensure compliance with a storm water pollution prevention plan or other permit conditions (e.g., general contractor, erosion control contractor) must submit an NOI at least two (2) days prior to commencing work on-site.
3. For storm water discharges from construction projects where the operator changes, including instances where an operator is added after an NOI has been submitted under Parts II.A.1 or II.A.2, the new operator must submit an NOI at least two (2) days before assuming operational control over site specifications or commencing work on-site.
4. Operators are not prohibited from submitting late NOIs. When a late NOI is submitted, authorization is only for discharges that occur after permit coverage is granted. The Agency reserves the right to take appropriate enforcement actions for any unpermitted activities that may have occurred between the time construction commenced and authorization of future discharges is granted (typically 2 days after a complete NOI is submitted).
5. Operators of on-going construction projects as of the effective date of this permit which received authorization to discharge for these projects under the 1992 baseline construction general permit must:
 - a. submit an NOI according to Part II.B. within 90 days of the effective date of this permit. If the permittee is eligible to submit a Notice of Termination (e.g., construction is finished and final stabilization has been achieved) before the 90th day, a new NOI is not required to be submitted;
 - b. for the first 90 days from the effective date of this permit, comply with the terms and conditions of the 1992 baseline construction general permit they were previously authorized under; and
 - c. update their storm water pollution prevention plan to comply with the requirements of Part IV within 90 days after the effective date of this permit.

A. Deadlines for Notification. (Continued)

6. Operators of on-going construction projects as of the effective date of this permit which did not receive authorization to discharge for these projects under the 1992 baseline construction general permit must:
 - a. prepare and comply with an interim storm water pollution prevention plan in accordance with the 1992 baseline construction general permit prior to submitting an NOI;
 - b. submit a NOI according to Part II.B; and
 - c. update their storm water pollution prevention plan to comply with the requirements of Part IV within 90 days after the effective date of this permit.

B. Contents of Notice of Intent (NOI).

1. The NOI form shall be signed in accordance with Part VI.G of this permit and shall include the following information:
 - a. the name, address, and telephone number of the operator filing the NOI for permit coverage;
 - b. an indication of whether the operator is a Federal, State, Tribal, private, or other public entity;

NOTE: All projects on Federal Facilities in Colorado must have an "F" in the Status of Owner/Operator box on the NOI. Even private contracting companies must put an "F" in that box so that we can tell its a Federal Facility project, thus regulated by EPA not the State of Colorado.

- c. the name (or other identifier), address, county, and latitude/longitude of the construction project or site;
- d. an indication of whether the project or site is located on Indian Country lands;
- e. confirmation that a storm water pollution prevention plan (SWPPP) has been developed or will be developed prior to commencing construction activities, and that the SWPPP will be compliant with any applicable local sediment and erosion control plans. Copies of SWPPPs or permits should not be included with the NOI submission;
- f. optional information: the location where the SWPPP may be viewed and the name and telephone number of a contact person for scheduling viewing times;
- g. the name of nearest named the receiving water(s);
- h. estimates of project start and completion dates, and estimates of the number of acres of the site on which soil will be disturbed (if less than 1 acre, enter "1");
- i. based on the instructions in Addendum A, whether any listed or proposed threatened or endangered species, or designated critical habitat, are in proximity to the storm water discharges or storm water discharge-related activities to be covered by this permit; and

B. Contents of Notice of Intent (NOI). (Continued)

- j. under which section(s) of Part I.B.3.e. (Endangered Species) the applicant is certifying eligibility.

Note that as of the effective date of this permit, reporting of information relating to the preservation of historic properties has been reserved and is not required at this time. Such reservation in no way relieves applicants or permittees from any otherwise applicable obligations or liabilities related to historic preservation under State, Tribal or local law. After further discussions between EPA and the Advisory Council on Historic Preservation, the Agency may modify the permit. Any such modification may affect future Notice of Intent reporting requirements.

C. Where to Submit.

1. NOIs must be signed in accordance with Part VI.G. and sent to the following address:

Storm Water Notice of Intent (4203)
US EPA
401 M. Street, SW
Washington, D.C. 20460

Part III. SPECIAL CONDITIONS, MANAGEMENT PRACTICES, AND OTHER NON-NUMERIC LIMITATIONS

A. Prohibition on Non-Storm Water Discharges.

1. Except as provided in Parts I.B.2 or 3 and III.A.2 or 3, all discharges covered by this permit shall be composed entirely of storm water associated with construction activity.
2. Discharges of material other than storm water that are in compliance with an NPDES permit (other than this permit) issued for that discharge may be discharged or mixed with discharges authorized by this permit.
3. The following non-storm water discharges from active construction sites are authorized by this permit provided the non-storm water component of the discharge is in compliance with Part IV.D.5 (non-storm water discharges): discharges from fire fighting activities; fire hydrant flushings; waters used to wash vehicles where detergents are not used; water used to control dust in accordance with Part IV.D.2.c.(2); potable water sources including waterline flushings; routine external building wash down which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; uncontaminated ground water or spring water; and foundation or footing drains where flows are not contaminated with process materials such as solvents.

B. Releases in Excess of Reportable Quantities. The discharge of hazardous substances or oil in the storm water discharge(s) from a facility shall be prevented or minimized in accordance with the applicable storm water pollution prevention plan for the facility. This permit does not relieve the permittee of the reporting requirements of 40 CFR 110, 40 CFR 117 and 40 CFR 302. Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR 110, 40 CFR 117 or 40 CFR 302, occurs during a 24 hour period:

1. The permittee is required to notify the National Response Center (NRC) (800-424-8802; in the Washington, DC, metropolitan area call 202-426-2675) in accordance with the requirements of 40 CFR 110, 40 CFR 117 and 40 CFR 302 as soon as he or she has knowledge of the discharge;
2. The storm water pollution prevention plan required under Part IV of this permit must be modified within 14 calendar days of knowledge of the release to: provide a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

C. Spills. This permit does not authorize the discharge of hazardous substances or oil resulting from an on-site spill.

D. Discharge Compliance with Water Quality Standards. Operators seeking coverage under this permit shall not be causing or have the reasonable potential to cause or contribute to a violation of a water quality standard. Where a discharge is already authorized under this permit and is later determined to cause or have the reasonable potential to cause or contribute to the violation of an applicable water quality standard, the Director will notify the operator of such violation(s). The permittee shall take all necessary actions to ensure future discharges do not cause or contribute to the violation of a water quality standard and document these actions in the storm water pollution prevention plan. If violations remain or

D. Discharge Compliance with Water Quality Standards. (Continued)

re-occur, then coverage under this permit may be terminated by the Director, and an alternative general permit or individual permit may be issued. Compliance with this requirement does not preclude any enforcement activity as provided by the Clean Water Act for the underlying violation.

E. Responsibilities of Operators. Permittees may meet one or both of the operational control components in the definition of "operator" found in Part IX.N. Either Parts III.E.1 or III.E.2 or both will apply depending on the type of operational control exerted by an individual permittee. Part III.E.3 applies to all permittees.

1. Permittees with operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications (e.g., developer or owner), must:
 - a. ensure the project specifications that they develop meet the minimum requirements of Part IV (Storm Water Pollution Prevention Plans (SWPPP)) and all other applicable conditions;
 - b. ensure that the SWPPP indicates the areas of the project where they have operational control over project specifications (including the ability to make modifications in specifications), and ensure all other permittees implementing portions of the SWPPP impacted by any changes they make to the plan are notified of such modifications in a timely manner; and
 - c. ensure that the SWPPP for portions of the project where they are operators indicates the name and NPDES permit number for parties with day-to-day operational control of those activities necessary to ensure compliance with the SWPPP or other permit conditions. If these parties have not been identified at the time the SWPPP is initially developed, the permittee with operational control over project specifications shall be considered to be the responsible party until such time as the authority is transferred to another party (e.g., general contractor) and the plan updated.
2. Permittee(s) with day-to-day operational control of those activities at a project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g., general contractor) must:
 - a. ensure that the SWPPP for portions of the project where they are operators meets the minimum requirements of Part IV (Storm Water Pollution Prevention Plan) and identifies the parties responsible for implementation of control measures identified in the plan;
 - b. ensure that the SWPPP indicates areas of the project where they have operational control over day-to-day activities;
 - c. ensure that the SWPPP for portions of the project where they are operators indicates the name and NPDES permit number of the party(ies) with operational control over project specifications (including the ability to make modifications in specifications);
3. Permittees with operational control over only a portion of a larger construction project (e.g., one of four homebuilders in a subdivision) are responsible for compliance with all applicable terms and conditions of this permit as it relates to their activities on their portion of the construction site, including protection of endangered species and implementation of BMPs and other controls required by the SWPPP. Permittees shall ensure either directly or through coordination with other permittees, that their activities do not render another party's pollution controls ineffective. Permittees must either implement their portions of a common SWPPP or develop and implement their own SWPPP.

Part IV. STORM WATER POLLUTION PREVENTION PLANS

At least one storm water pollution prevention plan (SWPPP) shall be developed for each construction project or site covered by this permit. For more effective coordination of BMPs and opportunities for cost sharing, a cooperative effort by the different operators at a site to prepare and participate in a comprehensive SWPPP is encouraged. Individual operators at a site may, but are not required, to develop separate SWPPPs that cover only their portion of the project provided reference is made to other operators at the site. In instances where there is more than one SWPPP for a site, coordination must be conducted between the permittees to ensure the storm water discharge controls and other measures are consistent with one another (e.g., provisions to protect listed species and critical habitat).

Storm water pollution prevention plans shall be prepared in accordance with good engineering practices. The SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges from the construction site. The SWPPP shall describe and ensure the implementation of practices which will be used to reduce the pollutants in storm water discharges associated with construction activity at the construction site and assure compliance with the terms and conditions of this permit.

When developing SWPPPs, applicants must follow the procedures in Addendum A of this permit to determine whether listed endangered or threatened species or critical habitat would be affected by the applicant's storm water discharges or storm water discharge-related activities. Any information on whether listed species or critical habitat are found in proximity to the construction site must be included in the SWPPP. Any terms or conditions that are imposed under the eligibility requirements of Part I.B.3.e and Addendum A of this permit to protect listed species or critical habitat from storm water discharges or storm water discharge-related activity must be incorporated into the SWPPP. Permittees must implement the applicable provisions of the SWPPP required under this part as a condition of this permit.

A. Deadlines for Plan Preparation and Compliance. The storm water pollution prevention plan shall:

1. be completed prior to the submittal of an NOI to be covered under this permit (except as provided in Parts II.A.5 and II.A.6) updated as appropriate; and
2. provide for compliance with the terms and schedule of the SWPPP beginning with the initiation of construction activities.

B. Signature, Plan Review and Making Plans Available.

1. The SWPPP shall be signed in accordance with Part VI.G, and be retained on-site at the facility which generates the storm water discharge in accordance with Part V (Retention of Records) of this permit.
2. The permittee shall post a notice near the main entrance of the construction site with the following information:
 - a. the NPDES permit number for the project or a copy of the NOI if a permit number has not yet been assigned;
 - b. the name and telephone number of a local contact person;
 - c. a brief description of the project; and

B. Signature, Plan Review and Making Plans Available. (Continued)

- d. the location of the SWPPP if the site is inactive or does not have an on-site location to store the plan.

If posting this information near a main entrance is infeasible due to safety concerns, the notice shall be posted in a local public building. If the construction project is a linear construction project (e.g., pipeline, highway, etc.), the notice must be placed in a publicly accessible location near where construction is actively underway and moved as necessary. This permit does not provide the public with any right to trespass on a construction site for any reason, including inspection of a site; nor does this permit require that permittees allow members of the public access to a construction site.

3. The permittee shall make SWPPPs available upon request to the Director, a State, Tribal or local agency approving sediment and erosion plans, grading plans, or storm water management plans; local government officials; or the operator of a municipal separate storm sewer receiving discharges from the site. The copy of the SWPPP that is required to be kept on-site or locally available must be made available to the Director for review at the time of an on-site inspection. Also, in the interest of public involvement, EPA encourages permittees to make their SWPPPs available to the public for viewing during normal business hours.
4. The Director may notify the permittee at any time that the SWPPP does not meet one or more of the minimum requirements of this Part. Such notification shall identify those provision of this permit which are not being met by the SWPPP as well as those requiring modification in order to meet the minimum requirements of this Part. Within seven (7) calendar days of receipt of such notification from the Director (or as otherwise provided by the Director), the permittee shall make the required changes to the SWPPP and shall submit to the Director a written certification that the requested changes have been made. The Director may take appropriate enforcement action for the period of time the permittee was operating under a plan that did not meet the minimum requirements of this permit.

C. Keeping Plans Current. The permittee must amend the storm water pollution prevention plan whenever:

1. There is a change in design, construction, operation, or maintenance which has a significant effect on the discharge of pollutants to the waters of the United States which has not been addressed in the SWPPP; or
2. Inspections or investigations by site operators, local, State, Tribal or Federal officials indicate the SWPPP is proving ineffective in eliminating or significantly minimizing pollutants from sources identified under Part IV.D.1 of this permit, or is otherwise not achieving the general objectives of controlling pollutants in storm water discharges associated with construction activity.

D. Contents of Plan. The storm water pollution prevention plan (SWPPP) shall include the following items:

1. **Site Description.** Each SWPPP shall provide a description of potential pollutant sources and other information as indicated below:
 - a. a description of the nature of the construction activity;

1. Site Description. (Continued)

- b. a description of the intended sequence of major activities which disturb soils for major portions of the site (e.g., grubbing, excavation, grading, utilities and infrastructure installation);
- c. estimates of the total area of the site and the total area of the site that is expected to be disturbed by excavation, grading, or other activities including off-site borrow and fill areas;
- d. an estimate of the runoff coefficient of the site for both the pre-construction and post-construction conditions and data describing the soil or the quality of any discharge from the site;
- e. a general location map (e.g., a portion of a city or county map) and a site map indicating the following: drainage patterns and approximate slopes anticipated after major grading activities; areas of soil disturbance; areas which will not be disturbed; locations of major structural and nonstructural controls identified in the SWPPP; locations where stabilization practices are expected to occur; locations of off-site material, waste, borrow or equipment storage areas; surface waters (including wetlands); and locations where storm water discharges to a surface water;
- f. location and description of any discharge associated with industrial activity other than construction, including storm water discharges from dedicated asphalt plants and dedicated concrete plants, which is covered by this permit;
- g. the name of the receiving water(s) and the areal extent and description of wetland or other special aquatic sites (as described under 40 CFR 230.3(q-1)) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project;
- h. a copy of the permit requirements (attaching a copy of this permit is acceptable); and
- i. information on whether listed endangered or threatened species, or critical habitat, are found in proximity to the construction activity and whether such species may be affected by the applicant's storm water discharges or storm water discharge-related activities.

- 2. Controls.** Each SWPPP shall include a description of appropriate control measures (i.e., BMPs) that will be implemented as part of the construction activity to control pollutants in storm water discharges. The SWPPP must clearly describe for each major activity identified in Part IV.D.1.b:
- a) appropriate control measures and the general timing (or sequence) during the construction process that the measures will be implemented; and b) which permittee is responsible for implementation (e.g., perimeter controls for one portion of the site will be installed by Contractor A after the clearing and grubbing necessary for installation of the measure, but before the clearing and grubbing for the remaining portions of the site; and perimeter controls will be actively maintained by Contractor B until final stabilization of those portions of the site up-gradient of the perimeter control; and temporary perimeter controls will be removed by the owner after final stabilization). The description and implementation of control measures shall address the following minimum components:

a. Erosion and Sediment Controls.

(1) *Short and Long Term Goals and Criteria:*

- (a) The construction-phase erosion and sediment controls should be designed to retain sediment on site to the extent practicable.

(1) *Short and Long Term Goals and Criteria:* (Continued)

- (b) All control measures must be properly selected, installed, and maintained in accordance with the manufacturers specifications and good engineering practices. If periodic inspections or other information indicates a control has been used inappropriately, or incorrectly, the permittee must replace or modify the control for site situations.
- (c) If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize offsite impacts (e.g., fugitive sediment in street could be washed into storm sewers by the next rain and/or pose a safety hazard to users of public streets).
- (d) Sediment must be removed from sediment traps or sedimentation ponds when design capacity has been reduced by 50%.
- (e) Litter, construction debris, and construction chemicals exposed to storm water shall be prevented from becoming a pollutant source for storm water discharges (e.g., screening outfalls, picked up daily).
- (f) Offsite material storage areas (also including overburden and stockpiles of dirt, borrow areas, etc.) used solely by the permitted project are considered a part of the project and shall be addressed in the SWPPP.

- (2) *Stabilization Practices:*** The SWPPP must include a description of interim and permanent stabilization practices for the site, including a schedule of when the practices will be implemented. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized. Stabilization practices may include but are not limited to: establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Use of impervious surfaces for stabilization should be avoided.

The following records shall be maintained and attached to the SWPPP: the dates when major grading activities occur; the dates when construction activities temporarily or permanently cease on a portion of the site; and the dates when stabilization measures are initiated.

Except as provided in Parts IV.D.2.a.(2)(a), (b), and (c) below, stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased.

- (a) Where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently cease is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable.
- (b) Where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within 21 days, temporary stabilization measures do not have to be initiated on that portion of site.

(2) *Stabilization Practices:* (Continued)

- (c) In arid areas (areas with an average annual rainfall of 0 to 10 inches), semi-arid areas (areas with an average annual rainfall of 10 to 20 inches), and areas experiencing droughts where the initiation of stabilization measures by the 14th day after construction activity has temporarily or permanently ceased is precluded by seasonal arid conditions, stabilization measures shall be initiated as soon as practicable.

(3) *Structural Practices:* The SWPPP must include a description of structural practices to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable. Structural practices may include but are not limited to: silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. Placement of structural practices in floodplains should be avoided to the degree attainable. The installation of these devices may be subject to section 404 of the CWA.

- (a) For common drainage locations that serve an area with ten (10) or more acres disturbed at one time, a temporary (or permanent) sediment basin that provides storage for a calculated volume of runoff from a 2 year, 24 hour storm from each disturbed acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. Where no such calculation has been performed, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. When computing the number of acres draining into an common location it is not necessary to include flows from offsite areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin.

In determining whether installing a sediment basin is attainable, the permittee may consider factors such as site soils, slope, available area on site, etc. In any event, the permittee must consider public safety, especially as it relates to children, as a design factor for the sediment basin and alternative sediment controls shall be used where site limitations would preclude a safe design. For drainage locations which serve ten (10) or more disturbed acres at one time and where a temporary sediment basin or equivalent controls is not attainable, smaller sediment basins and/or sediment traps should be used. Where neither the sediment basin nor equivalent controls are attainable due to site limitations, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries of the construction area and for those side slope boundaries deemed appropriate as dictated by individual site conditions. EPA encourages the use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal.

- (b) For drainage locations serving less than 10 acres, smaller sediment basins and/or sediment traps should be used. At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries (and for those side slope boundaries deemed appropriate as dictated by individual site conditions) of the construction area unless a sediment basin providing storage for a calculated volume

(3) *Structural Practices:* (Continued)

of runoff from a 2 year, 24 hour storm or 3,600 cubic feet of storage per acre drained is provided. EPA encourages the use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal.

- b. Storm Water Management. A description of measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed must be included in the SWPPP. Structural measures should be placed on upland soils to the degree attainable. The installation of these devices may also require a separate permit under section 404 of the CWA. Permittees are only responsible for the installation and maintenance of storm water management measures prior to final stabilization of the site, and are not responsible for maintenance after storm water discharges associated with construction activity have been eliminated from the site. However, post-construction storm water BMPs that discharge pollutants from point sources once construction is completed, may in themselves, need authorization under a separate NPDES permit.
- (1) Such practices may include but are not limited to: storm water detention structures (including wet ponds); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff onsite; and sequential systems (which combine several practices). The SWPPP shall include an explanation of the technical basis used to select the practices to control pollution where flows exceed predevelopment levels.
 - (2) Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel to provide a non-erosive flow velocity from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g. no significant changes in the hydrological regime of the receiving water).
- c. Other Controls.
- (1) No solid materials, including building materials, shall be discharged to waters of the United States, except as authorized by a permit issued under section 404 of the CWA.
 - (2) Off-site vehicle tracking of sediments and the generation of dust shall be minimized.
 - (3) The SWPPP shall be consistent with applicable State, Tribal and/or local waste disposal, sanitary sewer or septic system regulations to the extent these are located within the permitted area.
 - (4) The SWPPP shall include a description of construction and waste materials expected to be stored on-site with updates as appropriate. The SWPPP shall also include a description of controls to reduce pollutants from these materials including storage practices to minimize exposure of the materials to storm water, and spill prevention and response.
 - (5) The SWPPP shall include a description of pollutant sources from areas other than construction (including storm water discharges from dedicated asphalt plants and dedicated concrete plants), and a description of controls and measures that will be implemented at those sites to minimize pollutant discharges.

c. Other Controls. (Continued)

- (6) The SWPPP shall include a description of measures necessary to protect listed endangered or threatened species, or critical habitat, including any terms or conditions that are imposed under the eligibility requirements of Part I.B.3.e (4) of this permit. Failure to describe and implement such measures will result in storm water discharges from construction activities that are ineligible for coverage under this permit.

d. Approved State, Tribal or Local Plans.

- (1) Permittees which discharge storm water associated with construction activities must ensure their storm water pollution prevention plan is consistent with requirements specified in applicable sediment and erosion site plans or site permits, or storm water management site plans or site permits approved by State, Tribal, or local officials.
- (2) Storm water pollution prevention plans must be updated as necessary to remain consistent with any changes applicable to protecting surface water resources in sediment and erosion site plans or site permits, or storm water management site plans or site permits approved by State, Tribal or local officials for which the permittee receives written notice..

3. **Maintenance.** All erosion and sediment control measures and other protective measures identified in the SWPPP must be maintained in effective operating condition. If site inspections required by Part IV.D.4. identify BMPs that are not operating effectively, maintenance shall be performed before the next anticipated storm event, or as necessary to maintain the continued effectiveness of storm water controls. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable.

4. **Inspections.** Qualified personnel (provided by the permittee or cooperatively by multiple permittees) shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, and locations where vehicles enter or exit the site, at least once every fourteen (14) calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater.

Where sites have been finally or temporarily stabilized, runoff is unlikely due to winter conditions (e.g., site is covered with snow, ice, or frozen ground exists), or during seasonal arid periods in arid areas (areas with an average annual rainfall of 0 to 10 inches) and semi-arid areas (areas with an average annual rainfall of 10 to 20 inches) such inspections shall be conducted at least once every month.

Permittees are eligible for a waiver of monthly inspection requirements until one month before thawing conditions are expected to result in a discharge if all of the following requirements are met: 1) the project is located in an area where frozen conditions are anticipated to continue for extended periods of time (i.e., more than one month); 2) land disturbance activities have been suspended; and 3) the beginning and ending dates of the waiver period are documented in the SWPPP.

- a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Sediment and erosion control measures identified in the SWPPP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to

4. Inspections. (Continued)

receiving waters. Where discharge locations are inaccessible, nearby downstream locations shall be inspected to the extent that such inspections are practicable. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

- b. Based on the results of the inspection, the SWPPP shall be modified as necessary (e.g., show additional controls on map required by Part IV.D.1; revise description of controls required by Part IV.D.2) to include additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP shall be completed within 7 calendar days following the inspection. If existing BMPs need to be modified or if additional BMPs are necessary, implementation shall be completed before the next anticipated storm event. If implementation before the next anticipated storm event is impracticable, they shall be implemented as soon as practicable.
 - c. A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, and major observations relating to the implementation of the SWPPP shall be made and retained as part of the SWPPP for at least three years from the date that the site is finally stabilized. Major observations should include: the location(s) of discharges of sediment or other pollutants from the site; location(s) of BMPs that need to be maintained; location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location; and location(s) where additional BMPs are needed that did not exist at the time of inspection. Actions taken in accordance with Part IV.D.4.b of this permit shall be made and retained as part of the storm water pollution prevention plan for at least three years from the date that the site is finally stabilized. Such reports shall identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit. The report shall be signed in accordance with Part VI.G of this permit.
- 5. Non-Storm Water Discharges.** Except for flows from fire fighting activities, sources of non-storm water listed in Part III.A.2 or 3 of this permit that are combined with storm water discharges associated with construction activity must be identified in the SWPPP. The SWPPP shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

Part V. RETENTION OF RECORDS

- A. Documents. The permittee shall retain copies of storm water pollution prevention plans and all reports required by this permit, and records of all data used to complete the Notice of Intent to be covered by this permit, for a period of at least three years from the date that the site is finally stabilized. This period may be extended by request of the Director at any time.
- B. Accessibility. The permittee shall retain a copy of the storm water pollution prevention plan required by this permit (including a copy of the permit language) at the construction site (or other local location accessible to the Director, a State, Tribal or local agency approving sediment and erosion plans, grading plans, or storm water management plans; local government officials; or the operator of a municipal separate storm sewer receiving discharges from the site) from the date of project initiation to the date of final stabilization. Permittees with day-to-day operational control over SWPPP implementation shall have a copy of the SWPPP available at a central location on-site for the use of all operators and those identified as having responsibilities under the SWPPP whenever they are on the construction site.
- C. Addresses. Except for the submittal of NOIs and NOTs (see Parts II.C and VIII.B, respectively), all written correspondence concerning discharges in any State, Indian Country land or from any Federal facility covered under this permit and directed to the EPA, including the submittal of individual permit applications, shall be sent to the following address:

United States EPA, Region 8
Ecosystems Protection Program (8EPR-EP)
Storm Water Staff
999 18th Street, Suite 500
Denver, CO 80202-2466

Part VI. STANDARD PERMIT CONDITIONS

A. Duty to Comply.

1. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of CWA and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.
2. **Penalties for Violations of Permit Conditions.** The Director will adjust the civil and administrative penalties listed below in accordance with the Civil Monetary Penalty Inflation Adjustment Rule (Federal Register: December 31, 1996, Volume 61, Number 252, pages 69359-69366, as corrected, March 20, 1997, Volume 62, Number 54, pages 13514-13517) as mandated by the Debt Collection Improvement Act of 1996 for inflation on a periodic basis. This rule allows EPA's penalties to keep pace with inflation. The Agency is required to review its penalties at least once every four years thereafter and to adjust them as necessary for inflation according to a specified formula. The civil and administrative penalties listed below were adjusted for inflation starting in 1996.

a. Criminal.

- (1) *Negligent Violations.* The CWA provides that any person who negligently violates permit conditions implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than \$2,500 nor more than \$25,000 per day of violation, or by imprisonment for not more than 1 year, or both.
- (2) *Knowing Violations.* The CWA provides that any person who knowingly violates permit conditions implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than \$5,000 nor more than \$50,000 per day of violation, or by imprisonment for not more than 3 years, or both.
- (3) *Knowing Endangerment.* The CWA provides that any person who knowingly violates permit conditions implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act and who knows at that time that he is placing another person in imminent danger of death or serious bodily injury is subject to a fine of not more than \$250,000, or by imprisonment for not more than 15 years, or both.
- (4) *False Statement.* The CWA provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the Act, shall upon conviction, be punished by a fine of not more than \$10,000 or by imprisonment for not more than two years, or by both. If a conviction is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than \$20,000 per day of violation, or by imprisonment of not more than four years, or by both. (See section 309.c.4 of the Clean Water Act).

- b. Civil Penalties.** The CWA provides that any person who violates a permit condition implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed \$27,500 per day for each violation.

2. Penalties for Violations of Permit Conditions. (Continued)

- c. **Administrative Penalties.** The CWA provides that any person who violates a permit condition implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to an administrative penalty, as follows:

(1) *Class I Penalty.* Not to exceed \$11,000 per violation nor shall the maximum amount exceed \$27,500.

(2) *Class II Penalty.* Not to exceed \$11,000 per day for each day during which the violation continues nor shall the maximum amount exceed \$137,500.

- B. **Continuation of the Expired General Permit.** If this permit is not reissued or replaced prior to the expiration date, it will be administratively continued in accordance with the Administrative Procedures Act and remain in force and effect. Any permittee who was granted permit coverage prior to the expiration date will automatically remain covered by the continued permit until the earlier of:

1. Reissuance or replacement of this permit, at which time the permittee must comply with the Notice of Intent conditions of the new permit to maintain authorization to discharge; or
2. the permittee's submittal of a Notice of Termination; or
3. issuance of an individual permit for the permittee's discharges; or
4. a formal permit decision by the Director not to reissue this general permit, at which time the permittee must seek coverage under an alternative general permit or an individual permit.

- C. **Need to Halt or Reduce Activity not a Defense.** It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

- D. **Duty to Mitigate.** The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

- E. **Duty to Provide Information.** The permittee shall furnish to the Director or an authorized representative of the Director any information which is requested to determine compliance with this permit or other information.

- F. **Other Information.** When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the Notice of Intent or in any other report to the Director, he or she shall promptly submit such facts or information.

- G. **Signatory Requirements.** All Notices of Intent, Notices of Termination, storm water pollution prevention plans, reports, certifications or information either submitted to the Director or the operator of a large or medium municipal separate storm sewer system, or that this permit requires be maintained by the permittee, shall be signed as follows:

1. All Notices of Intent and Notices of Termination shall be signed as follows:

G. Signatory Requirements. (Continued)

- a. for a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25,000,000 (in second-quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
 - b. for a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or
 - c. for a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (1) the chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).
2. All reports required by this permit and other information requested by the Director or authorized representative of the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
- a. the authorization is made in writing by a person described above and submitted to the Director.
 - b. the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).
 - c. Changes to Authorization. If an authorization under Part II.B is no longer accurate because a different operator has responsibility for the overall operation of the construction site, a new Notice of Intent satisfying the requirements of Part II.B must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative. The change in authorization must be submitted within the time frame specified in Part II.A.3, and sent to the address specified in Part II.C.
 - d. Certification. Any person signing documents under Part VI.G shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

- H. **Penalties for Falsification of Reports.** Section 309(c)(4) of the Clean Water Act provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than \$10,000, or by imprisonment for not more than two years, or by both.
- I. **Oil and Hazardous Substance Liability.** Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under section 311 of the CWA or section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).
- J. **Property Rights.** The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.
- K. **Severability.** The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.
- L. **Requiring an Individual Permit or an Alternative General Permit.**
1. The Director may require any person authorized by this permit to apply for and/or obtain either an individual NPDES permit or an alternative NPDES general permit. Any interested person may petition the Director to take action under this paragraph. Where the Director requires a permittee authorized to discharge under this permit to apply for an individual NPDES permit, the Director shall notify the permittee in writing that a permit application is required. This notification shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the permittee to file the application, and a statement that on the effective date of issuance or denial of the individual NPDES permit or the alternative general permit as it applies to the individual permittee, coverage under this general permit shall automatically terminate. Applications shall be submitted to the appropriate Regional Office indicated in Part V.C of this permit. The Director may grant additional time to submit the application upon request of the applicant. If a permittee fails to submit in a timely manner an individual NPDES permit application as required by the Director under this paragraph, then the applicability of this permit to the individual NPDES permittee is automatically terminated at the end of the day specified by the Director for application submittal.
 2. Any permittee authorized by this permit may request to be excluded from the coverage of this permit by applying for an individual permit. In such cases, the permittee shall submit an individual application in accordance with the requirements of 40 CFR 122.26(c)(1)(ii), with reasons supporting the request, to the Director at the address for the appropriate Regional Office indicated in Part V.C of this permit. The request may be granted by issuance of any individual permit or an alternative general permit if the reasons cited by the permittee are adequate to support the request.
 3. When an individual NPDES permit is issued to a permittee otherwise subject to this permit, or the permittee is authorized to discharge under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. When an individual NPDES permit is denied to an owner or operator otherwise subject to this permit, or the owner or operator is denied for coverage under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the date of such denial, unless otherwise specified by the Director.

M. State/Tribal Environmental Laws.

1. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State/Tribal law or regulation under authority preserved by section 510 of the Act.
2. No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

N. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of storm water pollution prevention plans. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of this permit.

O. Inspection and Entry. The permittee shall allow the Director or an authorized representative of EPA, the State/Tribe, or, in the case of a construction site which discharges through a municipal separate storm sewer, an authorized representative of the municipal owner/operator or the separate storm sewer receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and
3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).

P. Permit Actions. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

Part VII. REOPENER CLAUSE

- A. If there is evidence indicating that the storm water discharges authorized by this permit cause, have the reasonable potential to cause or contribute to, a violation of a water quality standard, the permittee may be required to obtain an individual permit or an alternative general permit in accordance with Part I.C of this permit, or the permit may be modified to include different limitations and/or requirements.
- B. Permit modification or revocation will be conducted according to 40 CFR 122.62, 122.63, 122.64 and 124.5.
- C. EPA may propose a modification to this permit after further discussions between the Agency and the Advisory Council on Historic Preservation for the protection of historic properties.

Part VIII. TERMINATION OF COVERAGE

A. Notice of Termination. Permittees must submit a completed Notice of Termination (NOT) that is signed in accordance with Part VI.G of this permit when one or more of the conditions contained in Part I.D.2. (Terminating Coverage) have been met at a construction project. The NOT form found in Addendum D will be used unless it has been replaced by a revised version by the Director. The Notice of Termination shall include the following information:

1. The NPDES permit number for the storm water discharge identified by the Notice of Termination;
2. An indication of whether the storm water discharges associated with construction activity have been eliminated (i.e., regulated discharges of storm water are being terminated) or the permittee is no longer an operator at the site;
3. The name, address and telephone number of the permittee submitting the Notice of Termination;
4. The name of the project and street address (or a description of location if no street address is available) of the construction site for which the notification is submitted;
5. The latitude and longitude of the construction site; and
6. The following certification, signed in accordance with Part VI.G (signatory requirements) of this permit. For construction projects with more than one permittee and/or operator, the permittee need only make this certification for those portions of the construction site where the permittee was authorized under this permit and not for areas where the permittee was not an operator:

"I certify under penalty of law that all storm water discharges associated with industrial activity from the identified facility that authorized by a general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this notice of termination, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that discharging pollutants in storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act."

For the purposes of this certification, elimination of storm water discharges associated with construction activity means that all disturbed soils at the portion of the construction site where the operator had control have been finally stabilized (as defined in Part IX.I) and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time to ensure final stabilization is maintained, or that all storm water discharges associated with construction activities from the identified site that are authorized by a NPDES general permit have otherwise been eliminated from the portion of the construction site where the operator had control.

B. Addresses.

1. All Notices of Termination, signed in accordance with Part VI.G of this permit, are to be submitted using the form provided by the Director (or a photocopy thereof), to the address specified on the NOT form.

Part IX. DEFINITIONS

- A. **"Best Management Practices" ("BMPs")** means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.
- B. **"Control Measure"** as used in this permit, refers to any Best Management Practice or other method used to prevent or reduce the discharge of pollutants to waters of the United States.
- C. **"Commencement of Construction"** the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities.
- D. **"CWA"** means the Clean Water Act or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq.
- E. **"Director"** means the Regional Administrator of the Environmental Protection Agency or an authorized representative.
- F. **"Discharge"** when used without qualification means the "discharge of a pollutant."
- G. **"Discharge of Storm Water Associated with Construction Activity"** as used in this permit, refers to a discharge of pollutants in storm water runoff from areas where soil disturbing activities (e.g., clearing, grading, or excavation), construction materials or equipment storage or maintenance (e.g., fill piles, borrow areas, concrete truck washout, fueling), or other industrial storm water directly related to the construction process (e.g., concrete or asphalt batch plants) are located.
- H. **"Facility or Activity"** means any NPDES "point source" or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the NPDES program.
- I. **"Final Stabilization"** means that either:
1. All soil disturbing activities at the site have been completed and a uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed. In some parts of the country, background native vegetation will cover less than 100% of the ground (e.g., arid areas, beaches). Establishing at least 70% of the natural cover of native vegetation meets the vegetative cover criteria for final stabilization (e.g., if the native vegetation covers 50% of the ground, 70% of 50% would require 35% total cover for final stabilization; on a beach with no natural vegetation, no stabilization is required); or
 2. For individual lots in residential construction by either: a) the homebuilder completing final stabilization as specified above, or b) the homebuilder establishing temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for, and benefits of, final stabilization. (Homeowners typically have an incentive to put in landscaping functionally equivalent to final stabilization as quick as possible to keep mud out of their homes and off their sidewalks and driveways.); or

I. **"Final Stabilization"** (continued)

3. For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to "waters of the United States," and areas which are not being returned to their preconstruction agricultural use must meet the final stabilization criteria in (1) or (2) above.

J. **"Flow-Weighted Composite Sample"** means a composite sample consisting of a mixture of aliquots collected at a constant time interval, where the volume of each aliquot is proportional to the flow rate of the discharge.

K. **"Large and Medium Municipal Separate Storm Sewer System"** - means all municipal separate storm sewers that are either:

1. Located in an incorporated place (city) with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census (these cities are listed in Appendices F and G of 40 CFR 122); or
2. Located in the counties with unincorporated urbanized populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships or towns within such counties (these counties are listed in Appendices H and I of 40 CFR 122); or
3. Owned or operated by a municipality other than those described in paragraph (i) or (ii) and that are designated by the Director as part of the large or medium municipal separate storm sewer system.

L. **"NOI"** means Notice of Intent to be covered by this permit (see Part II of this permit.)

M. **"NOT"** means Notice of Termination (see Part VIII of this permit).

N. **"Operator"** for the purpose of this permit and in the context of storm water associated with construction activity, means any party associated with a construction project that meets either of the following two criteria:

1. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
2. The party has day-to-day operational control of those activities at a project which are necessary to ensure compliance with a storm water pollution prevention plan for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

This definition is provided to inform permittees of EPA's interpretation of how the regulatory definitions of "owner or operator" and "facility or activity" are applied to discharges of storm water associated with construction activity.

O. **"Owner or Operator"** means the owner or operator of any "facility or activity" subject to regulation under the NPDES program.

- P. **"Point Source"** means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.
- Q. **"Pollutant"** is defined at 40 CFR 122.2. A partial listing from this definition includes: dredged spoil, solid waste, sewage, garbage, sewage sludge, chemical wastes, biological materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial or municipal waste.
- R. **"Runoff Coefficient"** means the fraction of total rainfall that will appear at the conveyance as runoff.
- S. **"Storm Water"** means storm water runoff, snow melt runoff, and surface runoff and drainage.
- T. **"Storm Water Associated with Industrial Activity"** is defined at 40 CFR 122.26(b)(14) and incorporated here by reference. Most relevant to this permit is 40 CFR 122.26(b)(14)(x), which relates to construction activity including clearing, grading and excavation activities that result in the disturbance of five (5) or more acres of total land area, or are part of a larger common plan of development or sale.
- U. **"Waters of the United States"** means:
1. All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
 2. All interstate waters, including interstate "wetlands";
 3. All other waters such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:
 - a. Which are or could be used by interstate or foreign travelers for recreational or other purposes;
 - b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
 - c. Which are used or could be used for industrial purposes by industries in interstate commerce;
 4. All impoundments of waters otherwise defined as waters of the United States under this definition;
 5. Tributaries of waters identified in paragraphs (a) through (d) of this definition;
 6. The territorial sea; and
 7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs 1. through 6. of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA (other than cooling ponds for steam electric generation stations per 40 CFR 423) which also meet the criteria of this definition) are not waters of the United States. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.

ADDENDUM A - ENDANGERED SPECIES

I. Instructions for Applicants

A. Background

To meet its obligations under the Clean Water Act and the Endangered Species Act (ESA) and to promote those Acts' goals, the Environmental Protection Agency (EPA) is seeking to ensure the activities regulated by the Construction General Permit (CGP) are protective of endangered and threatened species and critical habitat. To ensure that those goals are met, applicants for CGP coverage are required under Part I.B.3.e. to assess the impacts of their storm water discharges and storm water discharge-related activities on Federally listed endangered and threatened species ("listed species") and designated critical habitat ("critical habitat") by following Steps One through Six listed below. EPA strongly recommends that applicants follow these steps at the earliest possible stage to ensure that measures to protect listed species and critical habitat are incorporated early in the planning process. At minimum, the procedures should be followed when developing the storm water pollution prevention plan.

Permittees and applicants also have an independent ESA obligation to ensure that their activities do not result in any prohibited "takes" of listed species.¹ Many of the measures required in the CGP and in these instructions to protect species may also assist permittees in ensuring that their construction activities do not result in a prohibited take of species in violation of § 9 of the ESA. Applicants who plan construction activities in areas that harbor endangered and threatened species are advised to ensure that they are protected from potential takings liability under ESA § 9 by obtaining either an ESA § 10 permit or by requesting formal consultation under ESA § 7 (as described in more detail in Step Seven below). Applicants who seek protection from takings liability should be aware that it is possible that some specific construction activities may be too unrelated to storm water discharges to be afforded incidental take coverage through an ESA § 7 consultation that is performed to meet the eligibility requirements for CGP coverage. In such instances, applicants should apply for an ESA § 10 permit. Where applicants are not sure whether to pursue a § 10 permit or a § 7 consultation for takings protection, they should confer with the appropriate Fish and Wildlife Service (FWS) or National Marine Fisheries Service (NMFS) office.

This permit provides for the possibility of multiple permittees at a construction site. Applicants should be aware that in many cases they can meet the permit eligibility requirements by relying on another operator's certification of eligibility under Part I.B.3.e.(2)(a), (b), or (c). This is allowed under Part I.B.3.e.(2)(d) of the permit. However, the other operator's certification must apply to the applicant's project area and must address the effects from the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat. By certifying eligibility under Part I.B.3.e.(2)(d), the applicant agrees to comply with any measures or controls upon which the other operator's certification under Part I.B.3.e.(2)(a), (b) or (c) was based. This situation will typically occur where a developer or primary contractor, such as one for construction of a subdivision or industrial park, conducts a comprehensive assessment of effects on listed species and critical habitat for the entire construction project, certifies eligibility under Part I.B.3.e.(2)(a), (b) or (c), and that certification is relied upon by other operators (i.e., contractors) at the site. However, applicants

¹ Section 9 of the ESA prohibits any person from "taking" a listed species (e.g., harassing or harming it) unless: 1) the taking is authorized through a "incidental take statement" as part of undergoing ESA § 7 formal consultation; 2) where an incidental take permit is obtained under ESA § 10 (which requires the development of a habitat conservation plan); or 3) where otherwise authorized or exempted under the ESA. This prohibition applies to all entities including private individuals, businesses, and governments.

A. Background (Continued)

that consider relying on another operator's certification should carefully review that certification along with any supporting information. If an applicant does not believe that the operator's certification provides adequate coverage for the applicant's storm water discharges and storm water discharge-related activities or for the applicant's particular project area, the applicant should provide its own independent certification under Part I.B.3.e.(2)(a), (b), or (c).

B. Procedures

To receive coverage under the Construction General Permit, applicants must assess the potential effects of their storm water discharges and storm water discharge-related activities on listed species and their critical habitat. To make this assessment, applicants must follow the steps outlined below prior to completing and submitting Notice of Intent (NOI) form. Applicants who are able to certify eligibility under Parts I.B.3.e.(2)(b), (c) or (d) because of a previously issued ESA § 10 permit, a previously completed ESA § 7 consultation, or because the applicant's activities were already addressed in another operator's certification of eligibility may proceed directly to Step Six.

Note - EPA's new NOI form which is included in Addendum C of this permit (published in the Federal Register on March 6, 1998, 63 FR 11253), requires that applicants provide detailed certification information on listed species. Previous versions of NOI forms should not be used any longer because they do not contain the specific certification provisions relating to listed species and critical habitats at construction projects. Use of the older NOI forms do not relieve applicants of their obligation to follow the procedures listed below to determine if their construction storm water discharges or storm water discharge-related activities meet permit eligibility requirements for the protection of listed species and critical habitat. By following these instructions, applicants will have sufficient information on listed species and critical habitat in order to complete the new NOI form (see Addendum C, page 45) and sign the certification statement.

Step One: Determine if the Construction Site Is Found Within Designated Critical Habitat for Listed Species

Some, but not all, listed species have designated critical habitat. Exact locations of such habitat is provided in the Service regulations at 50 CFR Parts 17 and 226. To determine if their construction site occurs within designated critical habitat, applicants should either:

- Contact the nearest Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) Office. A list of FWS and NMFS offices is found in Section II of this Addendum; or
- Contact the State or Tribal Natural Heritage Centers. These centers compile and disseminate information on Federally listed and other protected species. They frequently have the most current information on listed species and critical habitat. A list of these centers is provided in Section III of this Addendum; or

Step Three: (Continued)

- Contacting the nearest State or Tribal wildlife agency, the Fish and Wildlife Service (FWS), or the National Marine Fisheries Service (NMFS). Many endangered and threatened species are found in well-defined areas or habitats. Such information is frequently known to State, Tribal, or Federal wildlife agencies. A list of FWS and NMFS offices is provided in Section II of this Addendum below.
- Contacting local/regional conservation groups or the State or Tribal Natural Heritage Centers (see Section III of this Addendum). State and local conservation groups may have location specific listed species information. The Natural Heritage Centers inventory species and their locations and maintain lists of sightings and habitats.
- Submitting a data request to a Natural Heritage Center. Many of these centers will provide site specific information on the presence of listed species in a project area. Some of these centers will charge a fee for researching data requests.
- Conducting a formal biological survey. Larger construction sites with extensive storm water discharges may choose to conduct biological surveys as the most effective way to assess whether species are located in the project area and whether there are likely adverse effects. Biological surveys are frequently performed by environmental consulting firms. A biological survey can be used to follow Steps Four through Six of these instructions.
- Conducting an environmental assessment under the National Environmental Policy Act (NEPA). Some construction activities may require environmental assessments under NEPA. Such assessments may indicate if listed species are in the project area. Coverage under the CGP does not trigger such an assessment because the permit does not regulate any dischargers subject to New Source Performance Standards under Section 306 of the Clean Water Act, and is thus statutorily exempted from NEPA. See CWA § 511(c). However, some construction activities might require review under NEPA because of Federal funding or other Federal involvement in the project.

If no species are found in the project area, an applicant is eligible for CGP coverage. Applicants must provide the necessary certification on the NOI form. If listed species are found in the project area, applicants must indicate the location and nature of this presence in the storm water pollution prevention plan and follow Step Four.

Step Four: Determine if Listed Species or Critical Habitat are likely to be Adversely Affected by the Construction Activity's Storm Water Discharges or Storm Water Discharge-related Activities.

To receive CGP coverage, applicants must assess whether their storm water discharges or storm water discharge-related activities are likely to adversely affect listed species or critical habitat. "Storm water discharge-related activities" include:

- activities which cause, contribute to, or result in point source storm water pollutant discharges, including but not limited to excavation, site development, grading, and other surface disturbance activities; and

Step Four: (Continued)

- measures to control storm water discharges including the siting, construction, operation of best management practices (BMPs) to control, reduce or prevent storm water pollution.

Potential adverse effects from storm water discharges and storm water discharge-related activities include:

- Hydrological. Storm water discharges may cause siltation, sedimentation or induce other changes in receiving waters such as temperature, salinity or pH. These effects will vary with the amount of storm water discharged and the volume and condition of the receiving water. Where a storm water discharge constitutes a minute portion of the total volume of the receiving water, adverse hydrological effects are less likely. Construction activity itself may also alter drainage patterns on a site where construction occurs which can impact listed species or critical habitat.
- Habitat. Excavation, site development, grading, and other surface disturbance activities from construction activities, including the installation or placement of storm water BMPs, may adversely affect listed species or their habitat. Storm water may drain or inundate listed species habitat.
- Toxicity. In some cases, pollutants in storm water may have toxic effects on listed species.

The scope of effects to consider will vary with each site. If the applicant is having difficulty in determining whether his or her project is likely to adversely effect a listed specie or critical habitat, then the appropriate office of the FWS, NMFS or Natural Heritage Center listed in Sections II and III of this Addendum should be contacted for assistance. If adverse effects are not likely, then the applicant should make the appropriate certification on the NOI form and apply for coverage under the permit. If adverse effects are likely, applicants must follow Step Five.

Step Five: Determine if Measures Can Be Implemented To Avoid any Adverse Effects

If an applicant makes a preliminary determination that adverse effects are likely, it can still receive coverage under Part I.B.3.e.(2)(a) of the CGP if appropriate measures are undertaken to avoid or eliminate the likelihood of adverse effects prior to applying for permit coverage. These measures may involve relatively simple changes to construction activities such as re-routing a storm water discharge to bypass an area where species are located, relocating BMPs, or by changing the "footprint" of the construction activity. Applicants may wish to contact the FWS and/or NMFS to see what appropriate measures might be suitable to avoid or eliminate the likelihood of adverse impacts to listed species and/or critical habitat. (See 50 CFR 402.13(b)). This can entail the initiation of informal consultation with the FWS and/or NMFS which is described in more detail in Step Six.

Step Five: (Continued)

If applicants adopt measures to avoid or eliminate adverse affects, they must continue to abide by those measures during the course of permit coverage. These measures must be described in the storm water pollution prevention plan and may be enforceable as permit conditions. If appropriate measures to avoid the likelihood of adverse effects are not available to the applicant, the applicant must follow Step Six.

Step Six: Determine if the Eligibility Requirements of Part I.B.3.e.(2)(b)-(d) Can Be Met.

Where adverse effects are likely, the applicant must contact the EPA and FWS/NMFS. Applicants may still be eligible for CGP coverage if any likely adverse effects can be addressed through meeting the criteria of Part I.B.3.e.(2)(b)-(d) of the permit. These criteria are as follows:

1. An ESA Section 7 Consultation is Performed for the Applicant's Activity (See Part I.B.3.e.(2)(b))

Formal or informal ESA § 7 consultation is performed with the FWS and/or NMFS which addresses the effects of the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat. The formal consultation must result in either a "no jeopardy opinion" or a "jeopardy opinion" that identifies reasonable and prudent alternatives to avoid jeopardy which are to be implemented by the applicant. The informal consultation must result in a written concurrence by the Service(s) on a finding that the applicant's storm water discharge(s) and storm water discharge-related activities are not likely to adversely affect listed species or critical habitat (for informal consultation, see 50 CFR 402.13).

Most consultations are accomplished through informal consultation. By the terms of this permit, EPA has automatically designated applicants as non-Federal representatives for the purpose of conducting informal consultations. See Part I.B.3.e.(5) and 50 CFR 402.08 and 402.13. When conducting informal ESA § 7 consultation as a non-Federal representative, applicants must follow the procedures found in 50 CFR 402 of the ESA regulations.

Applicants must also notify EPA and the Services of their intention and agreement to conduct consultation as a non-Federal representative. Consultation may occur in the context of another Federal action at the construction site (e.g., where ESA § 7 consultation was performed for issuance of a wetlands dredge and fill permit for the project or where a NEPA review is performed for the project which incorporates a section 7 consultation). Any terms and conditions developed through consultations to protect listed species and critical habitat must be incorporated into the SWPPP. As noted above, applicants may, if they wish, initiate consultation with the Services at Step Five.

Whether ESA § 7 consultation must be performed with either the FWS, NMFS or both Services depends on the listed species which may be affected by the applicant's activity. In general, NMFS has jurisdiction over marine, estuarine, and anadromous species. Applicants should also be aware that while formal § 7 consultation provides protection from incidental takings liability, informal consultation does not.

Step Six: (Continued)

2. An Incidental Taking Permit Under Section 10 of the ESA is Issued for the Applicants Activity (See Part I.B.3.e.(2)(c))

The applicant's construction activities are authorized through the issuance of a permit under § 10 of the ESA and that authorization addresses the effects of the applicant's storm water discharge(s) and storm water discharge-related activities on listed species and critical habitat. Applicants must follow FWS and/or NMFS procedures when applying for an ESA Section 10 permit (see 50 CFR § 17.22(b)(1) (FWS) and § 222.22 (NMFS)). Application instructions for Section 10 permits for NMFS species can be obtained by 1) accessing the "Office of Protected Resources" sector of the NMFS Home Page at "<http://www.nmfs.gov>" or by contacting the National Marine Fisheries Service, Office of Protected Resources, Endangered Species Division, F/PR3, 1315 East-West Highway, Silver Spring, Maryland 20910; telephone (301) 713-1401, fax (301) 713-0376.

3. The Applicant Is Covered Under the Eligibility Certification of Another Operator for the Project Area (See Part I.B.3.e.(2)(d))

The applicant's storm water discharges and storm water discharge-related activities were already addressed in another operator's certification of eligibility under Part I.B.3.e.(2)(b), or (c) which also included the applicant's project area. By certifying eligibility under Part I.B.3.e.(2)(d), the applicant agrees to comply with any measures or controls upon which the other operator's certification under Part I.B.3.e.(2)(a), (b) or (c) was based. Certification under Part I.B.3.e.(2)(d) is discussed in more detail in Section I.A. of this addendum.

The applicant must comply with any terms and conditions imposed under the eligibility requirements of paragraphs I.B.3.e.(2)(a), (b), (c), (d) to ensure that its storm water discharges and storm water discharge-related activities are protective of listed species and/or critical habitat. Such terms and conditions must be incorporated in the project's SWPPP. If the eligibility requirements of Part I.B.3.e.(2)(a)-(d) cannot be met, then the applicant may not receive coverage under the CGP. Applicants should then consider applying to EPA for an individual permit.

II. LIST OF FISH AND WILDLIFE SERVICE OFFICES

A. U.S. FISH AND WILDLIFE SERVICE OFFICES

National Website For Endangered Species Information

Endangered Species Home page:
<http://www.fws.gov/~r9endspp/endspp.html>

Regional, State, Field and Project Offices Applicable to This Permit.

Region Six - Regional Office	
Division Chief, Endangered Species U.S. Fish and Wildlife Service ARD-Ecological Services P.O. Box 25486, DFC Denver, CO 80225	
State, Field, and Project Offices (Region Six)	
Field Supervisor U.S. Fish and Wildlife Service Colorado Field Office 730 Simms, Suite 290 Golden, CO 80401-4798	Field Supervisor U.S. Fish and Wildlife Service Western Colorado Field Office 764 Horizon Drive South, Annex A Grand Junction, CO 81506-3946
E.S. Coordinator U.S. Fish and Wildlife Service Rocky Mountain Arsenal National Wildlife Area, Building 111 Commerce City, CO 80022-1748	Colorado River Recovery Coordinator U.S. Fish and Wildlife Service P.O. Box 25486, DFC Denver, CO 80225

III. NATURAL HERITAGE CENTER

The Natural Heritage Network comprises 85 biodiversity data centers throughout the Western Hemisphere. These centers collect, organize, and share data relating to endangered and threatened species and habitat. The network was developed to inform land-use decisions for developers, corporations, conservationists, and government agencies and is also consulted for research and educational purposes. The centers maintain a Natural Heritage Network Control Server Website (<http://www.heritage.tnc.org>) which provides website and other access to a large number of specific biodiversity centers. The center located in Colorado is listed below:

Colorado Natural Heritage Program
Colorado State University
254 General Services Building
Fort Collins, CO 80523
970/491-1309 Fax: 970/491-3349

IV. COUNTY LIST OF ENDANGERED AND THREATENED SPECIES IN COLORADO

[The following list identifies federally listed or proposed U.S. species by State and County. It has been updated through September 1, 1997.]

Note: Species listed below with a status of both E and T are generally either endangered or threatened within the specified county. The assignment of two status designations for a species in a specific county is a function of the data set used to develop this list. For purposes of this permit, however, the obligation to assess the impact of storm water discharges on listed species does not vary based on which of the two statuses (e.g., endangered threatened) is assigned (see Addendum A Instructions). Designation of critical habitat (CH) does not mean that the county constitutes critical habitat, only that critical habitat has been designated for that species (see Addendum A Instructions).

State/County	Group name	Inverse name	Scientific name	Action/ Status
COLORADO				
ADAMS	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
ALAMOSA	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
ARCHULETA	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
BACA	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
BENT	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
BOULDER	FISHES	TROUT, GREENBACK CUTTHROAT	Salmo clarki stomias	L,T
	PLANTS	LADIES'-TRESSES, UTE	Spiranthes diluvialis	L,T
CHAFFEE	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	INSECTS	BUTTERFLY, UNCOMPAGRE FRITILLARY	Boloria acrocnema	L,E
CHEYENNE	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
CLEAR CREEK	FISHES	TROUT, GREENBACK CUTTHROAT	Salmo clarki stomias	L,T
CONEJOS	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
COSTILLA	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
CUSTER	BIRDS	FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	FISHES	TROUT, GREENBACK CUTTHROAT	Salmo clarki stomias	L,T
DELTA	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
	FISHES	SQUAWFISH, COLORADO	Ptychocheilus lucius	L,CH
		SUCKER, RAZORBACK	Xyrauchen texanus	L,E,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	CACTUS, SPINELESS HEDGEHOG	Echinocereus triglochidiatus var. inermis	L,E
		CACTUS, UINTA BASIN HOOKLESS	Sclerocactus glaucus(=Echinocactus g., S. whipplei)	L,T
		WILD-BUCKWHEAT, CLAY-LOVING	Eriogonum pelinophilum	L,E,CH
DOLORES	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
DOUGLAS	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	FISHES	TROUT, GREENBACK CUTTHROAT	Salmo clarki stomias	L,T
	INSECTS	SKIPPER, PAWNEE MONTANE	Hesperia leonardus (=pawnee) montana	L,T
EAGLE	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	INSECTS	BUTTERFLY, UNCOMPAGRE FRITILLARY	Boloria acrocnema	L,E
EL PASO	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH

Key: L - Listed, P - Proposed, E - Endangered, T - Threatened, CH - Critical Habitat

IV. COUNTY/SPECIES LIST CONTINUED

The following list identifies federally listed or proposed U.S. species by State and County. It has been updated through September 1, 1997.

State/County	Group name	Inverse name	Scientific name	Action/ Status
FREMONT GARFIELD	FISHES	TROUT, GREENBACK CUTTHROAT	Salmo clarki stomias	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	BIRDS	OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
GRAND		FALCON, PEREGRINE	Falco peregrinus	L,E
	FISHES	SQUAWFISH, COLORADO	Ptychocheilus lucius	L,CH
		SUCKER, RAZORBACK	Xyrauchen texanus	L,E,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
GUNNISON	PLANTS	CACTUS, UINTA BASIN HOOKLESS	Sclerocactus glaucus(=Echinocactus g., S. whipplei)	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	PLANTS	BEARDTONGUE, PENLAND	Penstemon penlandii	L,E
		MILK-VETCH, OSTERHOUT	Astragalus osterhoutii	L,E
HINSDALE	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
	INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocneuma	L,E
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
HUERFANO	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocneuma	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
JACKSON		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	FISHES	TROUT, GREENBACK CUTTHROAT	Salmo clarki stomias	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
JEFFERSON		FALCON, PEREGRINE	Falco peregrinus	L,E
	PLANTS	PHACELIA, NORTH PARK	Phacelia formosula	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	INSECTS	SKIPPER, PAWNEE MONTANE	Hesperia leonardus (=pawnee) montana	L,T
KIOWA	PLANTS	LADIES-TRESSES, UTE	Spiranthes diluvialis	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	LA PLATA	BIRDS	EAGLE, BALD	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
LAKE		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	CACTUS, KNOWLTON	Pediocactus knowltonii	L,E
	BIRDS	OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
LARIMER	FISHES	TROUT, GREENBACK CUTTHROAT	Salmo clarki stomias	L,T
	INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocneuma	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
LAS ANIMAS	FISHES	TROUT, GREENBACK CUTTHROAT	Salmo clarki stomias	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
LINCOLN		EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
	FISHES	CHUB, BONYTAIL	Gila elegans	L,E,CH
		CHUB, HUMPBAC	Gila cypha	L,E,CH
LOGAN		SQUAWFISH, COLORADO	Ptychocheilus lucius	L,CH
		SUCKER, RAZORBACK	Xyrauchen texanus	L,E,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	CACTUS, SPINELESS HEDGEHOG	Echinocereus triglochidiatus var. inermis	L,E
MOFFAT		CACTUS, UINTA BASIN HOOKLESS	Sclerocactus glaucus(=Echinocactus g., S. whipplei)	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	FISHES	CHUB, BONYTAIL	Gila elegans	L,E,CH
		CHUB, HUMPBAC	Gila cypha	L,E,CH

Key: L - Listed, P - Proposed, E - Endangered, T - Threatened, CH - Critical Habitat

IV. COUNTY/SPECIES LIST CONTINUED

The following list identifies federally listed or proposed U.S. species by State and County. It has been updated through September 1, 1997.

State/County	Group name	Inverse name	Scientific name	Action/ Status
MONTEZUMA	MAMMALS	SQUAWFISH, COLORADO	Ptychocheilus lucius	L,CH
		SUCKER, RAZORBACK	Xyrauchen texanus	L,E,CH
	BIRDS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
		EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	FISHES	SQUAWFISH, COLORADO	Ptychocheilus lucius	L,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	CACTUS, MESA VERDE	Scierocactus mesae-verdae (=Pediocactus m.)	L,T
		MILK-VETCH, MANCOS	Astragalus humillimus	L,E
MONTROSE	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
		FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	CACTUS, SPINELESS HEDGEHOG	Echinocereus triglochidiatus var. inermis	L,E
		CACTUS, UINTA BASIN HOOKLESS	Scierocactus glaucus(=Echinocactus g., S. whipplei)	L,T
	BIRDS	WILD-BUCKWHEAT, CLAY-LOVING	Eriogonum pelinophilum	L,E,CH
		EAGLE, BALD	Haliaeetus leucocephalus	L,T
		LADIES'-TRESSES, UTE	Spiranthes diluvialis	L,T
		FERRET, BLACK-FOOTED	Mustela nigripes	L,E
MORGAN	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		LADIES'-TRESSES, UTE	Spiranthes diluvialis	L,T
	PLANTS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		EAGLE, BALD	Haliaeetus leucocephalus	L,T
	BIRDS	FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocneuma	L,E
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FISHES	TROUT, GREENBACK CUTTHROAT	L,T
PARK	INSECTS	SKIPPER, PAWNEE MONTANE	Hesperia leonardus (=pawnee) montana	L,T
		MUSTARD, PENLAND ALPINE FEN	Eutrema penlandii	L,T
	PLANTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocneuma	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		EAGLE, BALD	Haliaeetus leucocephalus	L,T
	BIRDS	OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
		EAGLE, BALD	Haliaeetus leucocephalus	L,T
	FISHES	SQUAWFISH, COLORADO	Ptychocheilus lucius	L,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	BLADDERPOD, DUDLEY BLUFFS	Lesquerella congesta	L,T
RIO BLANCO	PLANTS	TWINPOD, DUDLEY BLUFFS	Physaria obcordata	L,T
		EAGLE, BALD	Haliaeetus leucocephalus	L,T
	BIRDS	FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
	INSECTS	OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
RIO GRANDE	INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocneuma	L,E
		FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
	BIRDS	OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
		BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocneuma	L,E
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
ROUTT	BIRDS	OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
		EAGLE, BALD	Haliaeetus leucocephalus	L,T
	BIRDS	FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocneuma	L,E
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	CACTUS, SPINELESS HEDGEHOG	Echinocereus triglochidiatus var. inermis	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		EAGLE, BALD	Haliaeetus leucocephalus	L,T
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
SAGUACHE	BIRDS	FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocneuma	L,E
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	CACTUS, SPINELESS HEDGEHOG	Echinocereus triglochidiatus var. inermis	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		EAGLE, BALD	Haliaeetus leucocephalus	L,T
	BIRDS	FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
SAN JUAN	BIRDS	FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		FALCON, PEREGRINE	Falco peregrinus	L,E
	BIRDS	OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
		BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocneuma	L,E
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	CACTUS, SPINELESS HEDGEHOG	Echinocereus triglochidiatus var. inermis	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		EAGLE, BALD	Haliaeetus leucocephalus	L,T
SEDGWICK	BIRDS	FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	INSECTS	BUTTERFLY, UNCOMPAHGRE FRITILLARY	Boloria acrocneuma	L,E
	MAMMALS	FERRET, BLACK-FOOTED	Mustela nigripes	L,E
	PLANTS	CACTUS, SPINELESS HEDGEHOG	Echinocereus triglochidiatus var. inermis	L,E
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
		EAGLE, BALD	Haliaeetus leucocephalus	L,T
	BIRDS	FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T

Key: L - Listed, P - Proposed, E - Endangered, T - Threatened, CH - Critical Habitat

IV. COUNTY/SPECIES LIST CONTINUED

The following list identifies federally listed or proposed U.S. species by State and County. It has been updated through September 1, 1997.

State/County	Group name	Inverse name	Scientific name	Action/ Status
SUMMIT	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
	PLANTS	MUSTARD, PENLAND ALPINE FEN	Eutrema penlandii	L,T
TELLER	BIRDS	FALCON, PEREGRINE	Falco peregrinus	L,E
		OWL, MEXICAN SPOTTED	Strix occidentalis lucida	L,T,CH
	INSECTS	SKIPPER, PAWNEE MONTANE	Hesperia leonardus (=pawnee) montana	L,T
WASHINGTON	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T
WELD	BIRDS	CRANE, WHOOPING	Grus americana	L,E,CH
		EAGLE, BALD	Haliaeetus leucocephalus	L,T
	PLANTS	LADIES'-TRESSES, UTE	Spiranthes diluvialis	L,T
YUMA	BIRDS	EAGLE, BALD	Haliaeetus leucocephalus	L,T

Key: L - Listed, P - Proposed, E - Endangered, T - Threatened, CH - Critical Habitat

ADDENDUM B - HISTORIC PROPERTIES (RESERVED)

Instructions related to historic preservation have not been included in the permit at this time. EPA may modify the permit to include such provisions at a later date. This does not relieve applicants or permittees of their responsibility to comply with applicable State, Tribal or local laws for the protection of historic properties.

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NPDES
FORM



United States Environmental Protection Agency
Washington, DC 20460

**Notice of Intent (NOI) for Storm Water Discharges Associated with
CONSTRUCTION ACTIVITY Under a NPDES General Permit**

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by a NPDES permit issued for storm water discharges associated with construction activity in the State/Indian Country Land identified in Section II of this form. Submission of this Notice of Intent also constitutes notice that the party identified in Section I of this form meets the eligibility requirements in Part I.B. of the general permit (including those related to protection of endangered species determined through the procedures in Addendum A of the general permit), understands that continued authorization to discharge is contingent on maintaining permit eligibility, and that implementation of the Storm Water Pollution Prevention Plan required under Part IV of the general permit will begin at the time the permittee commences work on the construction project identified in Section II below. IN ORDER TO OBTAIN AUTHORIZATION, ALL INFORMATION REQUESTED MUST BE INCLUDED ON THIS FORM. SEE INSTRUCTIONS ON BACK OF FORM.

I. Owner/Operator (Applicant) Information

Name: _____ Phone: _____
Address: _____ Status of Owner/Operator: ☐
City: _____ State: _____ Zip Code: _____

II. Project/Site Information

Project Name: _____
Project Address/Location: _____
City: _____ State: _____ Zip Code: _____
Latitude: _____ Longitude: _____ County: _____

Is the facility located on Indian
Country Lands?

Yes ☐ No ☐

Has the Storm Water Pollution Prevention Plan (SWPPP) been prepared? Yes ☐ No ☐

Optional: Address of location of SWPPP for viewing ☐ Address in Section I above ☐ Address in Section II above ☐ Other address (if known) below:

SWPPP Address: _____ Phone: _____

City: _____ State: _____ Zip Code: _____

Name of Receiving Water: _____

Month Day Year

Month Day Year

Estimated Construction Start Date

Estimated Completion Date

Estimate of area to be disturbed (to nearest acre): _____

Estimate of Likelihood of Discharge (choose only one):

1. ☐ Unlikely 3. ☐ Once per week 5. ☐ Continual
2. ☐ Once per month 4. ☐ Once per day

Based on instruction provided in Addendum A of the permit, are there any listed endangered or threatened species, or designated critical habitat in the project area?

Yes ☐ No ☐

I have satisfied permit eligibility with regard to protection of endangered species through the indicated section of Part I.B.3.e.(2) of the permit (check one or more boxes):

(a) ☐ (b) ☐ (c) ☐ (d) ☐

III. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage this system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name: _____ Date: _____

Signature: _____

**Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity to be Covered Under a NPDES Permit****Who Must File a Notice of Intent Form**

Under the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et seq.; the Act), except as provided by Part I.B.3 the permit, Federal law prohibits discharges of pollutants in storm water from construction activities without a National Pollutant Discharge Elimination System Permit. Operator(s) of construction sites where 5 or more acres are disturbed, smaller sites that are part of a larger common plan of development or sale where there is a cumulative disturbance of at least 5 acres, or any site designated by the Director, must submit an NOI to obtain coverage under an NPDES Storm Water Construction General Permit. If you have questions about whether you need a permit under the NPDES Storm Water program, or if you need information as to whether a particular program is administered by EPA or a State agency, write to or telephone the Notice of Intent Processing Center at (703) 931-3230.

Where to File NOI Form

NOIs must be sent to the following address:

Storm Water Notice of Intent (4203)
USEPA
401 M. Street, SW
Washington, D.C. 20460

Do not send Storm Water Pollution Prevention Plans (SWPPPs) to the above address. For overnight/express delivery of NOIs, please include the room number 2104 Northeast Mall and phone number (202) 260-9541 in the address.

When to File

This form must be filed at least 48 hours before construction begins.

Completing the Form

OBTAIN AND READ A COPY OF THE APPROPRIATE EPA STORM WATER CONSTRUCTION GENERAL PERMIT FOR YOUR AREA. To complete this form, type or print, using uppercase letters, in the appropriate areas only. Please place each character between the marks (abbreviate if necessary to stay within the number of characters allowed for each item). Use one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions on this form, call the Notice of Intent Processing Center at (703) 931-3230.

Section I. Facility Owner/Operator (Applicant) Information

Provide the legal name, mailing address, and telephone number of the person, firm, public organization, or any other entity that meet either of the following two criteria: (1) they have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or (2) they have the day-to-day operational control of those activities at the project necessary to ensure compliance with SWPPP requirements or other permit conditions. Each person that meets either of these criteria must file this form. Do not use a colloquial name. Correspondence for the permit will be sent to this address.

Enter the appropriate letter to indicate the legal status of the owner/operator of the project: F = Federal; S = State; M = Public (other than federal or state); P = Private.

Section II. Project/Site Information

Enter the official or legal name and complete street address, including city, county, state, zip code, and phone number of the project or site. If it lacks a street address, indicate with a general statement the location of the site (e.g., Intersection of State Highways 61 and 34). Complete site information must be provided for permit coverage to be granted.

The applicant must also provide the latitude and longitude of the facility in degrees, minutes, and seconds to the nearest 15 seconds. The latitude and longitude of your facility can be located on USGS quadrangle maps. Quadrangle maps can be obtained by calling 1-800 USA MAPS. Longitude and latitude may also be obtained at the Census Bureau Internet site: <http://www.census.gov/cgi-bin/gazetteer>.

Latitude and longitude for a facility in decimal form must be converted to degrees, minutes and seconds for proper entry on the NOI form. To convert decimal latitude or longitude to degrees, minutes, and seconds, follow the steps in the following example.

Convert decimal latitude 45.1234567 to degrees, minutes, and seconds.

- 1) The numbers to the left of the decimal point are degrees.
- 2) To obtain minutes, multiply the first four numbers to the right of the decimal point by 0.006. $1234 \times .006 = 7.404$.
- 3) The numbers to the left of the decimal point in the result obtained in step 2 are the minutes: 7'.
- 4) To obtain seconds, multiply the remaining three numbers to the right of the decimal from the result in step 2 by 0.06: $404 \times 0.06 = 24.24$. Since the numbers to the right of the decimal point are not used, the result is 24".
- 5) The conversion for $45.1234 = 45^\circ 7' 24"$.

Indicate whether the project is on Indian Country Lands.

Indicate if the Storm Water Pollution Prevention Plan (SWPPP) has been developed. Refer to Part IV of the general permit for information on SWPPPs. To be eligible for coverage, a SWPPP must have been prepared.

Optional: Provide the address and phone number where the SWPPP can be viewed if different from addresses previously given. Check appropriate box.

Enter the name of the closest water body which receives the project's construction storm water discharge.

Enter the estimated construction start and completion dates using four digits for the year (i.e. 05/27/1998).

Enter the estimated area to be disturbed including but not limited to: grubbing, excavation, grading, and utilities and infrastructure installation. Indicate to the nearest acre; if less than 1 acre, enter "1." Note: 1 acre = 43,560 sq. ft.

Indicate your best estimate of the likelihood of storm water discharges from the project. EPA recognizes that actual discharges may differ from this estimate due to unforeseen or chance circumstances.

Indicate if there are any listed endangered or threatened species, or designated critical habitat in the project area.

Indicate which Part of the permit that the applicant is eligible with regard to protection of endangered or threatened species, or designated critical habitat.

Section III. Certification

Federal Statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner of the proprietor, or

For a municipality, state, federal, or other public facility: by either a principal executive or ranking elected official. An unsigned or undated NOI form will not be granted permit coverage.

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 3.7 hours. This estimate includes time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Director, OPPE Regulatory Information Division (2137), U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460. Include the OMB control number on any correspondence. Do not send the completed form to this address.

THIS FORM REPLACES PREVIOUS FORM 3510-7 (8-92)

Form Approved. OMB No. 2040-0086

Please See Instructions Before Completing This Form

Approval expires: 8-31-98

NPDES
FORMUnited States Environmental Protection Agency
Washington, DC 20460**Notice of Termination (NOT) of Coverage Under a NPDES General Permit for Storm Water Discharges Associated with Industrial Activity**

Submission of this Notice of Termination constitutes notice that the party identified in Section II of this form is no longer authorized to discharge storm water associated with industrial activity under the NPDES program. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Permit InformationNPDES Storm Water
General Permit Number: _____Check Here if You are No Longer
the Operator of the Facility: ☐Check Here if the Storm Water
Discharge is Being Terminated: ☐**II. Facility Operator Information**

Name: _____ Phone: _____

Address: _____

City: _____ State: _____ ZIP Code: _____

III. Facility/Site Location Information

Name: _____

Address: _____

City: _____ State: _____ ZIP Code: _____

Latitude: _____ Longitude: _____ Quarter: _____ Section: _____ Township: _____ Range: _____

IV. Certification: I certify under penalty of law that all storm water discharges associated with industrial activity from the identified facility that are authorized by a NPDES general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this Notice of Termination, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that discharging pollutants in storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act.

Print Name: _____ Date: _____

Signature: _____

Instructions for Completing Notice of Termination (NOT) Form**Who May File a Notice of Termination (NOT) Form**

Permittees who are presently covered under an EPA-issued National Pollutant Discharge Elimination System (NPDES) General Permit (including the 1995 Multi-Sector Permit) for Storm Water Discharges Associated with Industrial Activity may submit a Notice of Termination (NOT) form when their facilities no longer have any storm water discharges associated with industrial activity as defined in the storm water regulations at 40 CFR 122.26(b)(14), or when they are no longer the operator of the facilities.

For construction activities, elimination of all storm water discharges associated with industrial activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with industrial activity from the construction site that are authorized by a NPDES general permit have otherwise been eliminated. Final stabilization means that all soil-disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

Where to File NOT Form

Send this form to the following address:

Storm Water Notice of Termination (4203)
401 M Street, S.W.
Washington, DC 20460

Completing the Form

Type or print, using upper-case letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use only one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions about this form, telephone or write the Notice of Intent Processing Center at (703) 931-3230.

Instructions - EPA Form 3510-7
Notice of Termination (NOT) of Coverage Under The NPDES General Permit
for Storm Water Discharges Associated With Industrial Activity

Section I Permit Information

Enter the existing NPDES Storm Water General Permit number assigned to the facility or site identified in Section III. If you do not know the permit number, telephone or write your EPA Regional storm water contact person.

Indicate your reason for submitting this Notice of Termination by checking the appropriate box:

If there has been a change of operator and you are no longer the operator of the facility or site identified in Section III, check the corresponding box.

If all storm water discharges at the facility or site identified in Section III have been terminated, check the corresponding box.

Section II Facility Operator Information

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same name as the facility. The operator of the facility is the legal entity which controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Section III Facility/Site Location Information

Enter the facility's or site's official or legal name and complete address, including city, state and ZIP code. If the facility lacks a street address, indicate the state, the latitude and longitude of the facility to the nearest 15 seconds, or the quarter, section, township, and range (to the nearest quarter section) of the approximate center of the site.

Section IV Certification

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, State, Federal, or other public facility: by either a principal executive officer or ranking elected official.

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 0.5 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Chief, Information Policy Branch, 2136, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

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SECTION 02210

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12/88

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-- End of Section Table of Contents --

SECTION 02210

GRADING
12/88

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 422	(1963; R 1990) Particle-Size Analysis of Soils
ASTM D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2216	(1992) Laboratory Determination of Water (Moisture) Content of Soil, and Rock
ASTM D 2487	(1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2488	(1993) Description and Identification of Soils (Visual-Manual Procedure)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1996) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1996) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.2 UNIT PRICE

1.2.1 MEASUREMENT

1.2.1.1 Excavation

The unit of measurement for excavation will be the cubic meter computed by the average end-area method from cross sections taken before and after the

excavation and borrow operations. The amount paid for will be the number of cubic meters of material, measured in its original position and removed from the excavation and borrow areas, including the excavation for ditches, gutters, and channel changes, which material is acceptably utilized or disposed of as herein specified. The measurement will include the excavation below grade of unsuitable material where ordered, and allowance will be made on the same basis for selected backfill ordered as replacement. The measurement will not include the amount excavated without authorization or the amount of any material used for other than directed purposes. Amount of overburden stripped from borrow pits, unless used as borrow material, will not be paid for. The measurement will not include the amount of any excavation performed prior to the taking of elevations and measurements of the undisturbed grade.

1.2.1.2 Topsoil

Separate excavation, hauling, and spreading or piling of topsoil and all miscellaneous operations attendant thereto will be considered subsidiary obligations of the Contractor, covered under the contract unit price for excavation.

1.2.1.3 Overhaul

The unit of measurement for overhaul will be the station meter. The number of station meters of overhaul to be paid for will be the product of the number of cubic meters of overhaul materials, measured in the original position, multiplied by the overhaul distance measured in stations of 100 meters. The overhaul distance will be the distance in stations between the center of volume of the overhauled material in its original position and the center of volume after placing, minus the free-haul distance in stations. The haul distance will be measured along the shortest route determined as feasible and satisfactory.

1.2.2 PAYMENT

1.2.2.1 Excavation

Excavation will be paid for at the contract unit price per cubic meter for "Excavation."

1.2.2.2 Overhaul

Overhaul will be paid for at the contract unit price per station meter for "Overhaul."

1.3 DEFINITIONS

1.3.1 Suitable Materials

Suitable materials are materials that classify according to ASTM D 2487 as GW, GP, GC, GM, SW, [SP,]SC, SM, CL, [CH,]and ML. Lime and flyash shall also be considered as suitable materials when used as stabilizing agents.

1.3.2 Unsuitable Materials

Unsuitable materials include all materials that are not defined above as suitable materials. In addition, unsuitable materials are materials that classify according to ASTM D 2487 as MH, OH, [CH,]Pt, [SP,]and OL. Unsuitable materials also include all material that contains debris,

refuse, roots, organic matter, frozen material, fine grained sedimentary rocks (i.e., shale, claystone, siltstone, mudstone, and marl) even though they may be intensely weathered, contamination from hazardous, toxic, biological or radiological substances, stone having a maximum dimension larger than 75 mm in any dimension, or other materials that are determined by the Contracting Officer as unsuitable for providing a stable subgrade or stable foundation for pavement. Otherwise suitable material which has excess moisture content shall not be classified as unsuitable material unless it cannot be dried by manipulation, aeration, or blending with other materials as determined by the Contracting Officer.

1.3.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

1.3.4 Expansive Soils

Expansive soils are defined as soils that have a plasticity index greater than 24 and a liquid limit greater than 49 when tested in accordance with ASTM D 4318.

1.3.5 Non-expansive Soils

Non-expansive soils are defined as soils with a plasticity index less than or equal to 24 and a liquid limit less than or equal to 49 when tested in accordance with ASTM D 4318.

1.3.6 Overhaul

Overhaul is the authorized transportation of suitable excavation or borrow materials in excess of the free-haul limit of [_____] stations. Overhaul is the product of the quantity of materials hauled beyond the free-haul limit and the distance such materials are hauled beyond the free-haul limit, expressed in station meters.

1.3.7 Acceptable Topsoil

Acceptable topsoil is defined as selectively excavated natural, friable soil that is representative of soils in the vicinity that produce heavy growths of crops, grass or other vegetation and is reasonably free from underlying subsoil, clay lumps, objectionable weeds, litter, brush, matted roots, toxic substances or any material that might be harmful to plant growth or be a hindrance to grading, planting or maintenance operations. Soil from ditch bottoms, drained ponds, eroded areas, or soil which is excessively wet or saturated is not acceptable. Topsoil shall not contain more than five percent by volume of stones, stumps or other objects larger than 25 mm in any dimension for field seeded areas and 15 mm in any dimension for lawn seeded areas. [Topsoil shall not be excessively acid or alkaline (pH value 6.0 to 7.5). Topsoil shall contain 5 to 20 percent organic matter as determined by the organic carbon 6A chemical analysis method described in USDA Soil Survey Investigation Report No. 1.] Topsoil shall be approved by the Contracting Officer. [See Section 02921A SEEDING for additional requirements.]

1.3.8 Spot Subgrade Reinforcement Material

Spot subgrade reinforcement material includes sound, tough, durable crushed stone, slag or gravel, consisting of pieces varying from 25 mm to 90 mm in diameter, or other approved material, with necessary filler. When a finer material is necessary for filler, broken stone chips, screened gravel, or sand may be used to completely fill all voids.

1.3.9 Pavements

Pavements shall include all roads, walk areas, graveled parking or walk areas, or any other type of surfaced area for driving or walking.

1.3.10 Standard Frame and Grate or Cover

Standard frame and grate or cover shall mean heavy-duty type frame and grate or cover as a minimum.

1.3.11 Degree of Compaction

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittal

Disposal Facility; G-A.

Location of disposal facility and appropriate documentation.

SD-06 Test Reports

Field Testing Control

Suitable Materials

Certified test reports and analysis certifying that the suitable materials proposed for use at the project site conform to the specified requirements, and for all tests conducted in accordance with paragraph FIELD TESTING CONTROL.

Borrow material; G-A1.

For each type of material[, with the exception of material reused from on-site excavation,] the following tests shall be performed:

Compaction curve, ASTM D 1557

Liquid limit, ASTM D 4318

Plastic limit, ASTM D 4318

Insitu moisture content, ASTM D 2216

Visual description of material, ASTM D 2488

Particle-size analysis, ASTM D 422

Soil classification, ASTM D 2487

SD-07 Certificates

Field Testing Control

Qualifications of the commercial testing laboratory who will be performing all testing in accordance with paragraph FIELD TESTING CONTROL.

PART 2 PRODUCTS

2.1 BORROW MATERIAL

Borrow material shall be selected to meet requirements and conditions of the particular fill for which it is to be used. Necessary clearing, grubbing, disposal of debris, and satisfactory drainage of borrow pits shall be performed by the Contractor as incidental operations to the borrow excavation.

2.1.1 Selection

Borrow materials shall be obtained from [the borrow areas shown][or] [sources outside the limits of Government-controlled land][or][sources within the limits of Government-controlled land, subject to approval]. Borrow materials shall be subject to approval. [Borrow material from approved sources on Government-controlled land may be obtained without payment of royalties. Unless specifically provided, no borrow shall be obtained within the limits of the project site without prior written approval.][The source of borrow material shall be the Contractor's responsibility. Unless otherwise provided in the contract, the Contractor shall obtain from the owners the right to procure material, shall pay all royalties and other charges involved, and shall bear all the expense of developing the sources, including rights-of-way for hauling.][Spot subgrade reinforcement material [and _____] shall be obtained from approved sources outside the limits of Government-controlled land at the Contractor's expense.]

2.1.2 Borrow Pits

[The Contractor shall notify the Contracting Officer sufficiently in advance of the opening of any excavation or borrow pit to permit elevations and measurements to be taken of the undisturbed ground surface.] Except as otherwise permitted, borrow pits shall be excavated to afford adequate drainage. Overburden and other spoil material shall be disposed of or used for special purposes. Borrow pits shall be neatly trimmed [and left in such shape as will facilitate taking accurate measurements] after the excavation is completed.

PART 3 EXECUTION

3.1 CONSERVATION OF TOPSOIL

Topsoil shall be removed [_____] millimeters, without contamination with subsoil, and stockpiled convenient to areas for later application or at locations specified. Topsoil shall be removed and stored separate from other excavated materials and piled free of roots, stones, and other undesirable materials. Any surplus of topsoil from excavations and grading shall be [stockpiled in locations indicated] [removed from the site].

3.2 EXCAVATION

Excavation of every description, regardless of material encountered, within the grading limits of the project shall be performed to the lines and grades indicated [including removal of existing bituminous surface course, concrete pavement and integral curb, pavement subcourses to the full depth, concrete walk, culverts, storm drains, subdrains, and storm drain and subdrain structures]. Suitable excavated material shall be transported to and placed in fill areas within the limits of the work. Unsuitable material encountered within the limits of the work shall be excavated below the grade shown and replaced with suitable material as directed. Such material excavated and the selected material ordered as replacement will be paid for by an equitable adjustment of the contract price under the clause of the CONTRACT CLAUSES of the contract entitled "Changes." Unsuitable material [and surplus excavated material not required for fill] shall be disposed of by the Contractor at his own expense and responsibility outside the limits of Government-controlled land. [Surplus excavated material not required for fill shall be disposed of by the Contractor in [designated waste areas] [areas approved for surplus material storage at his own expense and responsibility outside the limits of Government-controlled land].] [in designated [waste] area[s] [or in areas approved for surplus material storage] [at his own expense and responsibility outside of the limit of Government-controlled lands]]. [Disposal of materials outside Government-controlled lands shall be in accordance with federal, state, and local regulations. The location of any disposal facility located outside of the limit of Government-controlled lands shall be submitted to the Contracting Officer prior to removal from the project site. The Contractor shall submit documentation from the disposal facility to verify that it is licensed to accept the material. No material shall be removed from the project site without prior approval from the Contracting Officer. The Contractor shall notify the Contracting Officer if any material to be disposed of is found to contain hazardous, toxic, biological or radiological substances.] During construction, excavation and filling shall be performed in a manner and sequence that will [utilize all suitable material from required excavation prior to obtaining material from borrow and will] provide drainage at all times. [Material required for fills in excess of that produced by excavation within the grading limits shall be excavated from [the borrow areas indicated] [or from other] [approved areas selected by the Contractor, and approved by the Contracting Officer as specified below]].

3.3 EXCAVATION OF DITCHES

Ditches shall be cut accurately to the cross sections and grades indicated. All roots, stumps, rock and foreign matter in the sides and bottom of ditches shall be cut to conform to the slope, grade, and shape of the

section shown. Care shall be taken not to excavate ditches below the grades indicated. Excessive ditch excavation shall be backfilled to grade with suitable, thoroughly compacted material as directed. All ditches excavated under this section shall be maintained until final acceptance of the work. Suitable material excavated from ditches shall be placed in fill areas as directed. Unsuitable and excess excavated material shall be disposed of as specified above. No excavated material shall be deposited closer than 1 meter from the edges of the ditches.

3.4 UTILIZATION OF EXCAVATED MATERIALS

Suitable material removed from required excavation under this section [and any excess material from building excavation] shall be utilized in the formation of embankments, [subgrades,][shoulders,] slopes, [bedding,] backfill for [culverts and other] structures, and for such other purposes as directed. No excavated material shall be wasted without the authorization of the Contracting Officer. Material authorized to be wasted shall be disposed of as directed and in such manner as not to obstruct the flow characteristics of any stream or to impair the efficiency or appearance of any structure. No excavated material shall be deposited at any time in a manner that may endanger a partly finished structure by direct pressure, by overloading banks contiguous to the operations, or that may in any other way be detrimental to the completed work.

3.5 BACKFILL ADJACENT TO STRUCTURES

Backfill adjacent to structures shall be placed and compacted uniformly in such manner as to prevent wedging action or eccentric loading upon or against the structures. Slopes bounding or within areas to be backfilled shall be stepped or serrated to prevent sliding of the fill. During backfilling operations and in the formation of embankments, equipment that will overload the structure in passing over and compacting these fills shall not be used. [Backfill for [culverts,][storm drains][and] [subdrains], including the bedding, shall conform to the additional requirements as specified in Section 02630A STORM-DRAINAGE SYSTEM and Section 02620A SUBDRAINAGE SYSTEM.] Backfill for structures [other than [culverts][storm drains][and][subdrains]] shall conform to the additional requirements in Section 02316A EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.6 PREPARATION OF GROUND SURFACE FOR FILL

All vegetation, such as roots, brush, heavy sods, heavy growth of grass, and all decayed vegetable matter, rubbish, and other unsuitable material within the area upon which fill is to be placed, shall be stripped or otherwise removed before the fill is started. In no case will unsuitable material remain in or under the fill area. Stumps, logs and roots more than 40 mm in diameter shall be excavated and removed to a depth not less than 450 mm below the original ground surface. Sloped ground surfaces steeper than one vertical to four horizontal on which fill is to be placed shall be plowed, stepped, or broken up, as directed, in such manner that the fill material will bond with the existing surface. Prepared surfaces on which compacted fill is to be placed shall be wetted or dried as may be required to obtain the specified moisture content and density.

3.7 FILLS AND EMBANKMENTS

Fills and embankments herein designated as fills shall be constructed at the locations and to lines and grades indicated on the drawings. The

completed fill shall correspond to the shape of the typical sections shown on the drawings and shall meet the requirements of the particular case. Suitable material removed from the excavation shall be used in forming the necessary fill. Where otherwise suitable material is too wet, it shall be aerated or dried to provide the moisture content specified for compaction. The material shall be placed in successive horizontal layers of 200 mm to 300 mm in loose depth for the full width of the cross section, and compacted. Each layer shall be compacted before the overlaying lift is placed.

3.8 COMPACTION

Compaction shall be accomplished by means specified and to the following densities for various parts of the work. Deficiencies in construction shall be corrected by the Contractor at no additional cost to the Government.

3.8.1 Over-all or Overlot Areas

Each layer of fills constructed under this section [except for topsoil] shall be compacted to at least 90 percent of the maximum density as determined in paragraph Degree of Compaction. Cohesive soils shall be at a moisture content between [1][_____] percent below and [4][_____] percent above optimum moisture when compacted. Cohesionless soils shall be compacted at a moisture content as required to facilitate compaction without bulking.

3.8.2 Areas to Receive [Pavements][Railroads]

All fills for paved areas shall be compacted as specified for OVER-ALL OR OVERLOT AREAS, with the following exception. The upper layer forming the subgrade for [pavements][railroads] in both cut and fill areas, shall be compacted to at least 95 percent of maximum density as determined in paragraph Degree of Compaction.

3.8.2.1 Subgrade Preparation

The subgrade shall be shaped to line, grade and cross section with approved compaction equipment so as to provide a minimum compacted subgrade thickness of [_____] millimeters. This operation shall include any reshaping, aeration, wetting, or drying required. [The subgrade in cut sections shall be scarified and excavated for the full depth of compacted subgrade indicated on the drawings, and the excavated material shall be windrowed and bladed successively until thoroughly blended, then relaid and compacted. The subgrade in fill sections shall be windrowed and bladed successively until thoroughly blended, then compacted.] [Expansive cohesive soils shall be at a moisture content between 3 and 8 percent above optimum moisture when compacted.] The moisture content of [non-expansive] cohesive soils shall be adjusted within the range 1 percent below to 3 percent above optimum moisture when compacted. Cohesionless soils shall be compacted as required to facilitate compaction without bulking. All unsuitable material shall be removed and replaced with suitable material from excavation [or borrow] or, if so directed, with spot subgrade reinforcement material, all as approved by the Contracting Officer. Spot subgrade reinforcement, if required, will be paid for by an equitable adjustment of the contract price under the clause Entitled "Changes" of the CONTRACT CLAUSES. All boulders or ledge stone encountered in the excavation shall be removed or broken off to a depth of not less than 150 mm below the subgrade. The resulting area and all other low sections, holes, or depressions shall be brought to the

required grade with suitable material and the entire subgrade shaped to line, grade and cross section and thoroughly compacted as herein provided. [Subgrade compaction shall be extended to include the shoulders.]

3.8.2.2 Spot Subgrade Reinforcement

The use of spot subgrade reinforcement material shall be at the direction of and subject to the approval of the Contracting Officer. Unsuitable subgrade materials shall be removed, the bottom of the resulting excavation shaped uniformly and compacted firmly to the density specified for subgrade, and the required provisions for adequate drainage shall be made. The subgrade reinforcement material shall then be placed in the prepared excavation, in layers of not more than 200 mm, which shall be spread and rammed until level with the surrounding subgrade surface. The voids shall then be filled with necessary finer selected material and the area rolled, or tamped if inaccessible to the roller. The filling and rolling or tamping shall be continued until the entire mass is thoroughly compacted to not less than the density of the surrounding or adjacent areas. The surface shall be finished to conform accurately to the grade and cross section shown on the drawings.

3.9 PLACING TOPSOIL

All ground areas disturbed by construction under this contract and not built over, paved or otherwise surfaced shall be topsoiled.

3.9.1 Clearing

Prior to placing topsoil, vegetation shall be removed from the area and the ground surface cleared of all other materials that would hinder proper grading, tillage or subsequent maintenance operations.

3.9.2 Grading

Previously constructed grades shall be repaired if necessary so that the areas to be topsoiled shall conform to the section indicated on the drawings upon completion of topsoil placement.

3.9.3 Tillage

Subsequent to the above grading, the areas to be top-soiled shall be thoroughly scarified by approved means to a depth of at least 75 mm for bonding of topsoil with subsoil. The work shall be performed only during periods when beneficial results are likely to be obtained. When conditions are such, by reason of drought, excessive moisture, or other factors, that satisfactory results are not likely to be obtained, the work will be stopped by the Contracting Officer and shall be resumed only when directed.

Undulations or irregularities in the surface that would interfere with further construction operations or maintenance shall be leveled before the next specified operation.

3.9.4 Placing Topsoil

Topsoil shall be uniformly distributed on the designated areas and evenly spread to a minimum thickness of [100][_____] mm~\. Spreading shall be performed in such manner that planting can proceed with little additional soil preparation or tillage. The resulting surface shall meet the finish surface requirements specified in the following paragraph: FINISHED EXCAVATION, FILLS AND EMBANKMENTS. Topsoil shall not be placed when the

subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to proper grading or the proposed planting.

3.10 FIELD TESTING CONTROL

3.10.1 Sampling and Testing

All quality control sampling and testing shall be performed by the Contractor in accordance with Section 01451 CONTRACTOR QUALITY CONTROL and as specified herein.

3.10.2 Moisture-Density Determinations

Tests for determination of maximum density and optimum moisture shall be performed by the Contractor in accordance with ASTM D 1557, except that a mechanical tamper may be used provided the results are correlated with those obtained with the referenced hand tamper. Samples shall be representative of the materials to be placed. An optimum moisture-density curve shall be obtained for each principal type of material or combination of materials encountered or utilized. Results of these tests shall be the basis of control for compaction. The above testing shall include Atterberg limits, grain size determinations and specific gravity. A copy of these tests shall be furnished to the Contracting Officer with the construction quality control daily report.

3.10.3 Density Control

The Contractor shall adequately control his compaction operations by tests made in accordance with any of the following methods: ASTM D 1556, ASTM D 2167, or ASTM D 2922 and ASTM D 3017 to insure placement of materials within the limits of densities specified. [The Contractor shall obtain a service permit to use radiation producing machinery or radioactive materials in accordance with Section 01400 SPECIAL SAFETY REQUIREMENTS FOR DEMOLITION AND RENOVATION.] When ASTM D 2922 is used, the calibration curves shall be checked, and adjusted if necessary, using the sand cone method as described in paragraph "Calibration" of ASTM D 2922. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with the density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job, on each different type of material encountered, at intervals as directed by the Contracting Officer. If ASTM D 2922 is used for field density control, there should be at least one test performed according to ASTM D 1556 per every 10 tests performed according to ASTM D 2922-\ for correlation of test results. One test shall be made for each [3,000][_____] sq meters. or less for each layer of specified depth, except areas to receive pavements, for which one test shall be made for each [1,000][_____] sq meters or less for each layer. Additional tests shall be made as necessary. All test results shall be made available to the Contracting Officer. Acceptance tests may be made by the Government for verification of compliance; however, the Contractor shall not depend on such tests for his control of operations. Deficiencies in construction shall be corrected by the Contractor at no additional cost to the Government.

3.11 FINISHED EXCAVATION, FILLS, AND EMBANKMENTS

All areas covered by the project, including excavated and filled sections

and adjacent transition areas, shall be uniformly smooth graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations, except as otherwise specified. The finished surface shall be not more than 45 mm above or below the established grade or approved cross section and shall be free of depressed areas where water would pond. [All ditches shall be finished so as to drain readily.] The surface of embankments or excavated areas for road construction or other areas to be paved on which a base course or pavement is to be placed shall not vary more than 15 mm from the established grade and approved cross section.

3.12 PROTECTION

During construction, embankments and excavations shall be kept shaped and drained. Ditches and drains along the subgrade shall be maintained in such manner as to drain effectively at all times. Where ruts occur in the subgrade, the subgrade shall be brought to grade, reshaped if required, and recompacted prior to the placing of surfacing. The storage or stockpiling of materials on the subgrade will not be permitted. No surfacing shall be laid until the subgrade has been checked and approved, and in no case shall any surfacing be placed on a muddy subgrade or on one containing frost. Newly graded areas shall be protected from traffic and from erosion, and any settlement or washing away that may occur from any cause, prior to acceptance, shall be repaired and grades reestablished to the required elevations and slopes. All work shall be conducted in accordance with the environmental protection requirements of the contract.

3.12.1 Protection of Existing Service Lines and Utilities Structures

Existing utility lines that are shown on the drawings, or the locations of which are made known to the Contractor prior to excavation that are to be retained, [as well as utility lines constructed during excavation operations,] shall be protected from damage during excavation and backfilling, and if damaged, shall be repaired by the Contractor at his expense. In the event that the Contractor damages any existing utility lines that are not shown, or the locations of which are not made known to the Contractor, report thereof shall be made immediately to the Contracting Officer. If determined that repairs are to be made by the Contractor, such repairs will be made in accordance with the clause Entitled "Changes" of the CONTRACT CLAUSES. [When utility lines that are to be removed or relocated are encountered within the area of operations, the Contractor shall notify the Contracting Officer in ample time for the necessary measures to be taken to prevent interruption of the service.]

3.13 ADJUSTMENT OF EXISTING STRUCTURES

All manholes, valve boxes, or inlets of any nature within the project that do not conform to the new finish grade in either surfaced or unsurfaced areas shall be adjusted to the new finish grade. Where inlets, manholes, or valve boxes fall within a surfaced or unpaved roadway or parking, the existing frames and cover shall be removed and replaced with a heavy-duty frame and cover. The structure shall be adjusted as needed to fit the new conditions. All structures shall be of a type suitable for the intended use and shall conform to the requirements of the applicable section of these specifications.

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SECTION 02440

TRAFFIC SIGNS

10/01

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(2000) Carbon Structural Steel
ASTM A 123/A 123M	(2001) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM B 209	(2001) Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 209M	(2001) Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
ASTM D 4956	(2001) Retroreflective Sheeting for Traffic Control

FEDERAL HIGHWAY ADMINISTRATION

MUTCD	(2000) Manual on Uniform Traffic Control Devices
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1.2 SUBMITTALS (NOT USED)

1.3 GENERAL

All sign faces shall conform to MUTCD.

PART 2 PRODUCTS

2.1 SIGN POSTS

2.1.1 Steel Flanged Channel Section (U-Shape)

Steel posts shall be fabricated from steel conforming to ASTM A 36/A 36M and shall have a minimum yield strength of 207 MPa and a minimum tensile strength of 345 MPa. Steel posts shall have 7.9 to 9.5 mm diameter holes spaced at 25.4 or 50.8 mm centers punched or drilled along the centerline of the web prior to galvanizing for the entire length of the post. Posts shall be galvanized in accordance with ASTM A 123/A 123M.

2.2 ALUMINUM SIGN PANELS

Aluminum sign panels shall conform to ASTM B 209M, alloy no.-temper 6061-T6 or 5052-H38. The blanks shall be free from laminations, blisters, open seams, pits, holes, other defects that may affect their appearance or use. The thickness shall be uniform and the blank commercially flat.

2.3 RETROREFLECTIVE SHEETING

Retroreflective sheeting shall conform to ASTM D 4956, Type I, II, III, IV, V, or VI. Type I retroreflective sheeting shall conform to ASTM D 4956, except the minimum coefficients of retroreflection for brown type I sheeting shown in Table I of ASTM D 4956 are amended as follows: 2.0 cd/lx/m² at 0.2 degrees observation angle and -4 degrees entrance angle, 1.0 cd/lx/m² at 0.2 degrees observation angle and +30 degrees entrance angle and at 0.5 degrees observation angle and -4 degrees entrance angle, and 0.5 cd/lx/m² at 0.5 degrees observation angle and +30 degrees entrance angle. All retroreflective sheeting shall have a precoated adhesive which will permanently adhere to the sign panel surface.

2.4 HARDWARE

Bolts, nuts and metal washers shall be either aluminum alloy or commercial quality steel, hot-dip galvanized or cadmium plated after fabrication. Fiber washers shall be of commercial quality.

PART 3 EXECUTION

3.1 GENERAL

Insulating material shall be placed to prevent contact between aluminum and steel material.

3.2 SIGN POSTS

Steel sign posts shall either be driven with a suitable driving head or set in drilled or punched holes. Any posts damaged during driving or otherwise shall be replaced at no additional cost to the Government. [Sign posts shall be painted in accordance with Section 09900 PAINTING, GENERAL. Color shall be as indicated in Section 09915 COLOR SCHEDULE.]

3.3 SIGN PANELS

Clean, degrease and etch the face of metal panels using methods recommended by the retroreflective sheeting manufacturer. After cleaning and degreasing, retroreflective sheeting material shall be applied to the sign panels as recommended by the manufacturer. Shearing, cutting and punching shall be performed prior to preparing the blanks for application of reflective material. Holes shall not be field drilled in any part of the panel. [The back side of all sign panels shall be stamped with the month and year that the sign was manufactured. The date shall be located on the lower right side of the back of the sign panel and shall be approximately 6.4 mm high. The date shall be stamped into the sign panel material for a permanent record.] [The backs of sign panels shall be painted in accordance with Section 09900 PAINTING, GENERAL. Color shall be as indicated in Section 09915 COLOR SCHEDULE.] Any damaged sign panels shall be replaced at no additional cost to the Government.

3.4 LETTERS, NUMERALS, ARROWS, SYMBOLS, AND BORDERS

Letters, numerals, arrows, symbols, and borders shall be applied on the

retroreflective sheeting or opaque background of the sign using the direct or reverse screen process. Messages and borders of a color darker than the background shall be applied to the paint or the retroreflective sheeting using the direct process. Messages and borders shall be of a color lighter than the sign background and shall be applied using the reverse screen process. Opaque or transparent colors, inks, and paints of the type and quality recommended by the retroreflective sheeting manufacturer shall be used in the screen process. The screening shall be performed in a manner that results in a uniform color and tone, with sharply defined edges of legends and borders and without blemishes on the sign background that will affect intended use. The signs shall be air dried or baked after screening according to the manufacturer's recommendations to provide a smooth hard finish. Any signs with blister's or other blemishes shall be rejected.

3.5 LOCATION AND POSITION OF SIGNS

All signs shall be located and erected in accordance with the drawings and MUTCD. Unless otherwise shown, signs shall be erected with the sign faces and posts vertical. To reduce specular glare (mirror reflection), sign panels shall be turned 3 degrees away from the road in the direction of travel. The Contracting Officer's Representative shall inspect all signs for specular reflection at night after installation has been completed. If specular reflection is apparent on any sign, it shall be adjusted by the Contractor at his expense to eliminate or minimize specular reflection to the satisfaction of the Contracting Officer's Representative.

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PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

STATE DEPARTMENT OF HIGHWAYS, DIVISION OF HIGHWAYS, STATE OF
COLORADO (CDOT)

CDOT Standard Specifications for Road and
Bridge Construction, 1999 Edition

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO T 180 (1993) Moisture-Density Relations of Soils
Using a 4.54-kg (10-lb) Rammer and an 457
mm (18-in) Drop

AASHTO T 193 (1993) The California Bearing Ratio

AASHTO TP53 (1995) Determining Asphalt Content of Hot
Mix Asphalt by the Ignition Method

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 185 (1994) Steel Welded Wire Fabric, Plain,
for Concrete Reinforcement

ASTM C 31/C 31M (1996) Making and Curing Concrete Test
Specimens in the Field

ASTM C 39 (1996) Compressive Strength of Cylindrical
Concrete Specimens

ASTM C 88 (1998) Soundness of Aggregates by Use of
Sodium Sulfate or Magnesium Sulfate

ASTM C 136 (1996a) Sieve Analysis of Fine and Coarse
Aggregates

ASTM C 143 (1990a) Slump of Hydraulic Cement Concrete

ASTM C 150 (1998) Portland Cement

ASTM C 192/C 192M (1995) Making and Curing Concrete Test
Specimens in the Laboratory

ASTM C 231 (1997) Air Content of Freshly Mixed

Concrete by the Pressure Method

ASTM C 566	(1997) Total Evaporable Moisture Content of Aggregate by Drying
ASTM C 881	(1990) Epoxy-Resin-Base Bonding Systems for Concrete
ASTM D 946	(1982; R 1993) Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D 1461	(1985; R 1994) Moisture or Volatile Distillates in Bituminous Paving Mixtures
ASTM D 1557	(1991; R 1998) Laboratory Compaction Characteristics of Soils Using Modified Effort (56,000 ft-lbf/ft (2,700 kN-m/m))
ASTM D 2041	(1995) Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D 2172	(1995) Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D 2726	(1996a) Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixture
ASTM D 2950	(1991; R 1997) Density of Bituminous Concrete in Place by Nuclear Method
ASTM D 3203	Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D 3405	(1996) Joint Sealants, Hot-Applied, for Concrete and Asphalt Pavements
ASTM D 3666	(1996a) Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials
ASTM D 4125	(1994) Asphalt Content of Bituminous Mixtures by the Nuclear Method
ASTM D 4867/D 4867M	(1996) Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D 5444	(1994) Mechanical Size Analysis of Extracted Aggregate
ASTM D 5893	(1996) Cold Applied, Single Component Chemically Curing Silicon Joint Sealant for Portland Cement Concrete Pavement
ASTM D 6307	(1998) Asphalt Content of Hot Mix Asphalt by Ignition Method

CORPS OF ENGINEERS (COE) HAND BOOK FOR CONCRETE AND CEMENT

CRD-C 525 (1989) Corps of Engineers Test Method for
Evaluation of Hot-Applied Joint Sealants
for Bubbling Due to Heating

ASPHALT INSTITUTE (AI)

AI MS-2 (1994) Mix Design Methods for Asphalt
Concrete and Other Hot-Mix Types

1.2 MEASUREMENT AND PAYMENT

Section "MEASUREMENTS AND PAYMENT" of the CDOT shall not apply.

1.3 MODIFICATION TO THE CDOT

Reference to "Engineer" and "Department" in the CDOT shall mean the
Contracting Officer or Representative.

1.4 DEFINITIONS

For the purposes of this specification, the following definitions apply.

1.4.1 Degree of Compaction

Degree of compaction of [aggregate base course,] [rigid pavement base
course,] [subbase course,] [and aggregate surface course] shall be
expressed as a percentage of the maximum density obtained by the test
procedure presented in either ASTM D 1557 or AASHTO T 180, Method D. The
maximum density shall be determined in accordance with ASTM D 1557 if the
material gradation contains less than 30 percent retained on the 19 mm
sieve or AASHTO T 180 if the material gradation contains more than 30
percent retained on the 19 mm sieve. In this specification, degree of
compaction shall be a percentage of laboratory maximum density.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation;
submittals not having a "G" designation are for information only. When
used, a designation following the "G" designation identifies the office
that will review the submittal for the Government. The following shall be
submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Plant, Equipment, and Tools

Job Mix Formula; G-A.

Proposed JMF.

Mixture Proportions; G-A.

The report of the Contractor's mixture proportioning studies showing the
proportions of all ingredients and supporting information on aggregate and
other materials that will be used in the manufacture of concrete, at least
14 days prior to commencing concrete placing operations.

SD-06 Test Reports

Initial Tests; G-A.

Certified copies of test results for approval not less than 20 days before material is required for the work.

Contractor Quality Control; G-A.

The Contractor shall submit all QC test results to the Contracting Officer on a daily basis as the tests are performed.

Acceptability of Work; G-A.

The Contractor shall submit all test results to the Contracting Officer on a daily basis as the tests are performed.

SD-07 Certificates

Asphalt Cement Binder; G-A.

Copies of certified test data.

Bituminous Tack and Prime Coat; G-A.

Copies of certified test data.

SD-08 Manufacturer's Instructions

Manufacturer's Recommendations; G-A

Where installation procedures, or any part thereof, are required to be in accordance with the manufacturer's recommendations, printed copies of these recommendations, 20 days prior to use on the project. Installation of the material will not be allowed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

1.6 SAMPLING AND TESTING

Sampling and testing shall be the responsibility of the Contractor. Sampling and testing shall be performed by a testing laboratory approved in accordance with Section 01451 CONTRACTOR QUALITY CONTROL. Work requiring testing will not be permitted until the testing laboratory has been inspected and approved. The materials shall be tested to establish compliance with the specified requirements; testing shall be performed at the specified frequency. The Contracting Officer may specify the time and location of the tests.

1.7 APPROVAL OF MATERIAL

The source of the material for aggregate base course, subbase course, rigid pavement base course, and aggregate surface course shall be selected 30 days prior to the time the material will be required in the work. Tentative approval of material will be based on initial test results. Final approval of the materials will be based on sieve analysis, liquid limit, and plasticity index tests performed on samples taken from the completed and fully compacted base and subbase course.

1.8 WEATHER LIMITATIONS

1.8.1 Hot-Mix Asphalt Pavement

The hot-mix asphalt pavement shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 1. The temperature requirements may be waived by the Contracting Officer, if requested; however, all other requirements, including compaction, shall be met.

Table 1. Surface Temperature Limitations of Underlying Course

<u>Mat Thickness, mm</u>	<u>Degrees C</u>
75 or greater	4
Less than 75	7

1.8.2 Bituminous Prime and Tack Coat

Bituminous coat shall be applied only when the surface to receive the bituminous coat is dry. Bituminous coat shall be applied only when the atmospheric temperature in the shade is 10 degrees C or above and when the temperature has not been below 2 degrees C for the 12 hours prior to application.

1.8.3 Portland Cement Concrete Pavement

Limitations on the placing of concrete shall conform to Section 412.09, "Limitations of Placing Concrete" of the CDOT.

1.8.4 Base Course, Subbase Course, Aggregate Surface Course

Construction of aggregate base course, subbase course, rigid pavement base course, and aggregate surface course shall be done when the atmospheric temperature is above 2 degrees C. When the temperature falls below 2 degrees C, the Contractor shall protect all completed areas by approved methods against detrimental effects of freezing. Completed areas damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirements.

1.9 PLANT, EQUIPMENT, AND TOOLS

All plant, equipment, and tools used in the performance of the work shall be subject to approval before the work is started and shall be maintained in satisfactory working condition at all times. The equipment shall be adequate and shall have the capability of producing pavements meeting the requirements as set forth herein.

PART 2 PRODUCTS

2.1 HOT-MIX ASPHALT PAVEMENT

Bituminous wearing course shall conform to the requirements specified in the CDOT, Section 401, "PLANT MIX PAVEMENTS- GENERAL, and Section 403, "HOT BITUMINOUS PAVEMENT", except as modified herein. The aggregate shall be Grading [S] [SX]. Coarse aggregate shall meet the following additional requirements: Percentage of loss shall not exceed 18 after 5 cycles when performed in accordance with ASTM C 88, using magnesium sulfate. The

Contractor shall develop the mix design. The laboratory used to develop the job mix formula (JMF) shall meet the requirements of ASTM D 3666. A certification signed by the manager of the laboratory stating that it meets these requirements or clearly listing all deficiencies shall be submitted to the Contracting Officer prior to the start of construction. The asphalt mix shall be dense-graded and composed of a mixture of well-graded aggregate, mineral filler if required, and asphalt material. The hot-mix asphalt shall be designed using Marshall method of mix design contained in AI MS-2 and the criteria shown in Table 3. If the Tensile Strength Ratio (TSR) of the composite mixture, as determined by ASTM D 4867/D 4867M is less than 75, the aggregates shall be rejected or the asphalt mixture treated with an approved anti-stripping agent. The amount of anti-stripping agent added shall be sufficient to produce a TSR of not less than 75. If an antistrip agent is required, it shall be provided by the Contractor at no additional cost. The hot-mix asphalt pavement shall not contain more than 15 percent reclaimed asphalt pavement.

2.1.1.1 JMF Requirements

The job mix formula shall be submitted in writing by the Contractor for approval at least 14 days prior to the start of the test section and shall include as a minimum:

- a. Percent passing each sieve size.
- b. Percent of asphalt cement.
- c. Percent of each aggregate and mineral filler to be used.
- d. Asphalt viscosity grade or performance grade.
- e. Number of blows of hammer per side of molded specimen.
- f. Laboratory mixing temperature.
- g. Lab compaction temperature.
- h. Temperature-viscosity relationship of the asphalt cement.
- i. Plot of the combined gradation on the 0.45 power gradation chart, stating the nominal maximum size.
- j. Graphical plots of stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt content as shown in AI MS-2.
- k. Specific gravity and absorption of each aggregate.
- l. Percent natural sand.
- m. Percent particles with 2 or more fractured faces (in coarse aggregate).
- n. Fine aggregate angularity.
- o. Percent flat or elongated particles (in coarse aggregate).
- p. Tensile Strength Ratio (TSR).

- q. Antistrip agent (if required) and amount.
- r. List of all modifiers and amount.
- s. Percentage and properties (asphalt content, binder properties, and aggregate properties) of reclaimed asphalt pavement (RAP) if RAP is used.

Table 2. Marshall Design Criteria

<u>Test Property</u>	<u>75 Blow Mix</u>	<u>50 Blow Mix</u>
Stability, newtons minimum	*8000	*4450
Flow, 0.25 mm	8-16	8-18
Air voids, percent	3-5	3-5
Percent Voids in mineral aggregate (VMA), (minimum)		
Grading S	13.0	13.0
Grading SX	14.0	14.0
TSR, minimum percent	75	75

* This is a minimum requirement. The average during construction shall be significantly higher than this number to ensure compliance with the specifications.

** Calculate VMA in accordance with AI MS-2, based on ASTM D 2726 bulk specific gravity for the aggregate.

2.1.2 Adjustments to Field JMF

The Laboratory JMF for each mixture shall be in effect until a new formula is approved in writing by the Contracting Officer. Should a change in sources of any materials be made, a new laboratory jmf design shall be performed and a new JMF approved before the new material is used.

2.1.3 Asphalt Cement Binder

Asphalt cement shall conform to the requirements specified in Section 702, "Bituminous Materials" of the CDOT. Asphalt cement binder shall be either viscosity grade AC-10 or Performance Grade (PG) 58-28 or ASTM D 946 penetration grade 85-100. Test data indicating grade certification shall be provided by the supplier at the time of delivery of each load to the mix plant. Copies of these certifications shall be submitted to the Contracting Officer. The supplier is defined as the last source of any modification to the binder.

2.2 BITUMINOUS TACK AND PRIME COAT

Test data indicating grade certification shall be provided by the supplier. Copies of these certifications shall be submitted to the Contracting Officer.

2.2.1 Bituminous Prime Coat

Bituminous prime coat shall conform to the requirements specified in Section 407, "Prime Coat, Tack Coat, and Rejuvenating Agent", and Section 702, "BITUMINOUS MATERIALS", of the CDOT. Bituminous materials shall be liquid asphalt, designation MC-30, or MC-70 at the Contractor's option, except that only MC-30 shall be used on dense graded base courses if MC-70 does not adequately penetrate the base course material. In lieu of cut-back asphalt, the Contractor may use cationic emulsified asphalt, designation CSS-1 or CSS-1h.

2.2.2 Bituminous Tack Coat

Bituminous tack coat shall conform to the requirements specified in Section 407, "Prime Coat, Tack Coat, and Rejuvenating Agent" of the CDOT. Bituminous material shall be emulsified asphalt designation SS-1 or SS-1h, or cationic emulsified asphalt designation CSS-1 or CSS-1h.

2.3 PORTLAND CEMENT CONCRETE PAVEMENT

2.3.1 Portland Cement Concrete

Portland cement concrete shall conform to the requirements specified in Section 412, "Portland Cement Concrete Pavement", and Section 601 "Structural Concrete" of the CDOT. Proportioning [and required 28-day field compressive strength] of the mix shall conform to the requirements of Class "P" concrete[, except that the required 28-day field compressive strength shall be [35 MPa]. The coarse aggregate shall have a maximum nominal size of 38 mm. The maximum allowable slump of the concrete shall be 75 mm for pavement constructed with fixed forms. For slipformed pavement, the maximum allowable slump shall be 30 mm. The water-cement ratio shall not exceed 0.45. The air content of the concrete by volume shall be maintained by the Contractor at 6.0 percent plus or minus 1.0 percent. The Contractor shall submit design mixture proportions, laboratory trial mix, aggregate data, and 28-day compressive strength test results in accordance with Section 601.05, "Proportioning" of the CDOT.

2.3.2 Welded Steel Wire Fabric

Welded steel wire fabric shall conform to ASTM A 185.

2.3.3 Dowels Bars and Tie Bars

Dowel bars and tie bars shall conform to Section 709.03 "Dowel Bars and Tie Bars" of the CDOT.

2.3.4 Epoxy Resin

Epoxy resin materials for embedding dowels shall be two-component materials conforming to the requirements of ASTM C 881, Type IV, Grade 3. Class shall be appropriate for each application temperature to be encountered.

2.4 CONCRETE SIDEWALK AND CURB AND GUTTER

2.4.1 General

Portland cement concrete shall conform to Section 601, "STRUCTURAL CONCRETE", of the CDOT, except as modified herein. Concrete shall be Class B or D. Coarse aggregate shall meet Number 57 or 67 gradation. The portland cement shall be Type I or II, and meet the optional chemical

requirements for low alkali when tested in accordance with ASTM C 150.

2.4.2 Sidewalks

Portland cement concrete sidewalk shall conform to the requirements as specified in Section 608, "SIDEWALKS AND BIKEWAYS" of the CDOT.

2.4.3 Curb and Gutter

Portland cement concrete curb and gutter shall conform to the requirements as specified in Section 609, "CURB AND GUTTER", of the CDOT.

2.5 CURING MATERIALS

Curing materials for portland cement concrete pavement and sidewalk shall conform to Section 711.01 "Curing Materials" of the CDOT. Liquid membrane-forming compound shall be white pigmented type 2.

2.6 JOINT FILLER, BACKER ROD AND SEALANT

Preformed expansion joint filler and backer rod shall conform to Section 705.01, "Joint Fillers" of the CDOT. Cold-applied silicone joint sealant shall conform to ASTM D 5893. Cold-applied silicone sealant for sidewalks shall be gray or stone in color. Hot-applied joint sealant shall conform to ASTM D 3405 and CRD-C 525.

2.7 AGGREGATE BASE COURSE (ABC)

Aggregate base course aggregate shall conform to the requirements specified in Section 304, "AGGREGATE BASE COURSE" and Section 703.03 "AGGREGATE FOR BASES", of the CDOT, except as modified herein. Aggregate base course shall be CDOT Class 4 except as otherwise specified herein. The portion retained on the 4.75 mm sieve shall be known as coarse aggregate; that portion passing the 4.75 mm sieve shall be known as fine aggregate. Aggregates shall be angular particles of uniform density. Coarse aggregate shall be crushed gravel, crushed stone, crushed recycled concrete, or crushed slag. Fine aggregate shall consist of screenings, angular sand, crushed recycled concrete fines, or other finely divided mineral matter processed or naturally combined with the coarse aggregate. The amount of flat and elongated particles shall not exceed 30 percent. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. In the portion retained on each sieve specified, the crushed aggregates shall contain at least 50 percent by weight of crushed pieces having two or more freshly fractured faces with the area of each face being at least equal to 75 percent of the smallest midsectional area of the piece. When two fractures are contiguous, the angle between planes of the fractures must be at least 30 degrees in order to count as two fractured faces. Crushed gravel shall be manufactured from gravel particles 50 percent of which, by weight, are retained on the maximum size sieve. The percentage of loss shall not exceed 18 after 5 cycles when performed in accordance with ASTM C 88, using magnesium sulfate. The portion of the material passing the 0.425 mm sieve shall have liquid limit not greater than 25 and a plasticity index not greater than 5. When tested for gradation, the percentage passing the 0.075 mm sieve shall not exceed 10 percent and the 0.02 mm sieve shall not exceed 3.0 percent.

2.8 RIGID PAVEMENT BASE COURSE

Rigid pavement base course aggregate shall conform to the requirements specified in Section 304, "AGGREGATE BASE COURSE" and Section 703.03 "AGGREGATE FOR BASES", of the CDOT, except as modified herein. Rigid pavement base course shall be CDOT Class 5 except as otherwise specified herein. The aggregate shall meet the following additional properties; the aggregate shall be a crushed quarry rock, [crushed gravel, crushed screenings, sand or a combination thereof]. The percentage of loss shall not exceed 18 after 5 cycles when performed in accordance with ASTM C 88, using magnesium sulfate. The portion of the material passing the 0.425 mm sieve shall have liquid limit not greater than 25 and a plasticity index not greater than 5. When tested for gradation, the percentage passing the 0.075 mm sieve shall be between 9 percent and 15 percent. The 0.02 mm sieve shall not exceed 6.0 percent.

2.9 SUBBASE COURSE

Subbase course aggregate shall conform to the requirements specified in Section 304, "AGGREGATE BASE COURSE" and Section 703.03 "AGGREGATE FOR BASES", of the CDOT, except as modified herein. Subbase courses shall be CDOT Class 5 except as otherwise specified herein. The aggregate shall meet the following additional properties; the aggregate shall be a crushed quarry rock, [crushed gravel, crushed screenings, sand or a combination thereof]. The subbase course shall have a minimum California Bearing Ratio (CBR) of 50. The CBR shall be determined in accordance with AASHTO T 193. The percentage of loss shall not exceed 18 after 5 cycles when performed in accordance with ASTM C 88, using magnesium sulfate. The portion of the material passing the 0.425 mm sieve shall have liquid limit not greater than 25 and a plasticity index not greater than 5. When tested for gradation, the percentage passing the 0.075 mm sieve shall be between 9 percent and 15 percent. The 0.02 mm sieve shall not exceed 6.0 percent.

2.10 AGGREGATE SURFACE COURSE

Crushed aggregate surface course aggregate shall conform to the requirements specified in Section 304, "AGGREGATE BASE COURSE" and Section 703.03 "AGGREGATE FOR BASES", of the CDOT, except as modified herein. Aggregates shall consist of crushed stone or slag, crushed or natural gravel, sand, or other sound, durable materials processed and blended or naturally combined. Aggregates shall be durable and sound, free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign material. The aggregate shall meet the gradation requirement for Class 7. The amount of flat and elongated particles shall not exceed 20 percent. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. The aggregate for the surface course shall contain a minimum 80 percent crushed material. The portion of the material passing the 0.425 mm shall have a liquid limit not greater than 35 and a plasticity index of 4 to 9.

2.11 INITIAL TESTS

One of each of the following tests shall be performed on the proposed aggregate base course, rigid pavement base course, subbase course and aggregate surface course material prior to commencing construction to demonstrate that the proposed material meets all specified requirements when furnished. If materials from more than one source are going to be utilized, this testing shall be completed for each source.

- a. Sieve Analysis including 0.02 mm size material.

- b. Liquid limit and plasticity index moisture-density relationship.
- c. Moisture-density relationship.
- d. Wear.
- e. Soundness.

PART 3 EXECUTION

3.1 PAVEMENT REMOVAL

Where p.c. concrete and bituminous pavement is to be removed [at the locations shown on the drawings], the pavement shall be sawed with a pre-approved concrete saw so as to leave a straight true edge. P.C. concrete pavement removal shall be accomplished by a full depth double sawcut. The initial sawcut shall be located in the pavement area to be removed and shall be 450 mm from the final sawcut. The pavement material [and existing base course] shall be removed in a manner that will not damage the adjacent in-place pavement to remain [and as shown on the drawings]. The Contractor must demonstrate that his method of removal will not damage adjacent concrete pavement slabs. Any slab found by the Contracting Officer to be damaged by the Contractor's removal methods shall be fully removed and replaced at no cost to the Government. Pavement material from the removal area shall be disposed of [outside the limits of Government controlled land at the Contractor's expense] [at the disposal area indicated on the drawings].

3.2 HOT-MIX ASPHALT PAVEMENT

Hot-mix asphalt pavement wearing course shall be constructed to the requirements specified in the CDOT, Section 401, "PLANT MIX PAVEMENTS-GENERAL" and Section 403, "HOT BITUMINOUS PAVEMENT", except as modified herein.

3.2.1 Contractor Quality Control

A standard lot for all requirements will be equal to 8 hours of production.

3.2.1.1 Asphalt Content

A minimum of two tests to determine asphalt content will be performed per lot by one of the following methods: the extraction method in accordance with ASTM D 2172, Method A or B, the ignition method in accordance with the AASHTO TP53 or ASTM D 6307, or the nuclear method in accordance with ASTM D 4125, provided the nuclear gauge is calibrated for the specific mix being used. For the extraction method, the weight of ash, as described in ASTM D 2172, shall be determined as part of the first extraction test performed at the beginning of plant production; and as part of every tenth extraction test performed thereafter, for the duration of plant production. The last weight of ash value obtained shall be used in the calculation of the asphalt content for the mixture.

3.2.1.2 Gradation

Aggregate gradations shall be determined a minimum of twice per lot from mechanical analysis of recovered aggregate in accordance with ASTM D 5444. When asphalt content is determined by the nuclear method, aggregate

gradation shall be determined from hot bin samples on batch plants, or from the cold feed on drum mix plants. For batch plants, aggregates shall be tested in accordance with ASTM C 136 using actual batch weights to determine the combined aggregate gradation of the mixture.

3.2.1.3 Temperatures

Temperatures shall be checked at least four times per lot, at necessary locations, to determine the temperature at the dryer, the asphalt cement in the storage tank, the asphalt mixture at the plant, and the asphalt mixture at the job site.

3.2.1.4 Aggregate Moisture

The moisture content of aggregate used for production shall be determined a minimum of once per lot in accordance with ASTM C 566.

3.2.1.5 Moisture Content of Mixture

The moisture content of the mixture shall be determined at least once per lot in accordance with ASTM D 1461 or an approved alternate procedure.

3.2.1.6 Laboratory Air Voids, Marshall Stability and Flow

Mixture samples shall be taken at least four times per lot and compacted into specimens, using [50] [75] blows per side with the Marshall hammer. After compaction, the laboratory air voids of each specimen shall be determined, as well as the Marshall stability and flow.

3.2.2 Acceptability of Work

The pavement will be accepted on the basis of tests made by the the Contractor or its suppliers, as specified herein. The Government may, at its discretion, make check tests to validate the results of the Contractor's testing.

3.2.2.1 Sampling Pavements

Samples of the finished pavement, shall be obtained by the Contractor. The location of the samples shall be as directed and the cores shall be at least 100 mm in diameter. The samples shall be tested by the Contractor to determine conformance to density. Specimens shall be tested in accordance with the requirements of ASTM D 2726. Three samples shall be taken and tested for each 680 metric tons or less of bituminous mixture placed each day. A minimum of one core shall be obtained from the longitudinal joint. The Contractor shall fill all cores holes with new material and shall meet the requirements as described herein.

3.2.2.2 Laboratory Air Voids

Laboratory air voids will be calculated by determining the Marshall density of each laboratory compacted specimen using ASTM D 2726 and determining the theoretical maximum density of every other subplot sample using ASTM D 2041. Laboratory air void calculations for each subplot will use the latest theoretical maximum density values obtained, either for that subplot or the previous subplot. The mean absolute deviation of the four laboratory air void contents (one from each subplot) from the JMF air void content will be evaluated. The mean absolute deviation shall be less than 1.00. All laboratory air void tests will be completed and reported within 24 hours

after completion of construction of each lot.

3.2.2.3 In-place Density

Density of the compacted mixture of the bituminous wearing course shall be between 97 and 100 percent (joint density 95 to 100 percent) of the maximum laboratory compacted density. The maximum laboratory compacted specimens shall be determined from the same mixture taken from the plant in accordance with ASTM D 2041. Densities of the in-place compacted mixture may be determined by the nuclear method in accordance with ASTM D 2950 for Contractor quality control purposes. In any event, the basis of acceptance for density shall be determined from the specific gravity method.

3.2.2.4 Surface Smoothness

After the final rolling, but not later than 24 hours after placement, the surface of the pavement in each entire lot shall be tested by the Contractor in such a manner as to reveal all surface irregularities exceeding the tolerances specified below. If any pavement areas are ground, these areas shall be retested immediately after grinding. All testing shall be performed in the presence of the Contracting Officer. Detailed notes of the results of the testing shall be kept and a copy furnished to the Government immediately after each day's testing. The entire area of the pavement shall be tested in both a longitudinal and a transverse direction on parallel lines. The transverse lines shall be 8 m or less apart, as directed. The longitudinal lines shall be at the centerline of each paving lane for lines less than 6 m and at the third points for lanes 6 m or greater. Other areas having obvious deviations shall also be tested. Longitudinal testing lines shall be continuous across all joints. Where drawings show required deviations from a plane surface (crowns, drainage inlets, etc.), the surface shall be finished to meet the approval of the Contracting Officer. The straightedge shall be held in contact with the surface and moved ahead one-half the length of the straightedge for each successive measurement. The amount of surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between these two high points. The finished surfaces of the pavements shall have no abrupt change of 5 mm or more, and all pavements shall be within the tolerances specified in Table 3 when checked with an approved 3 m straightedge.

Table 3. Straightedge Surface Smoothness--Pavements

<u>Pavement Category</u>	<u>Direction of Testing</u>	<u>Tolerance, mm</u>
-----	-----	-----
All	Longitudinal	5
paved areas	Transverse	5

3.3 BITUMINOUS TACK AND PRIME COAT

Except as otherwise specified herein, application of bituminous tack and prime coat shall be in accordance with Section 407, PRIME COAT, TACK COAT, AND REJUVENATING AGENT" of the CDOT. Following application of the bituminous material and prior to the application of the pavement, the bituminous coat shall be allowed to cure and to obtain evaporation of any volatiles or moisture.

3.3.1 Bituminous Tack Coat

Contact surfaces of previously constructed pavement, curbs, manholes, and other structures shall be sprayed with a thin coat of bituminous tack coat. Rate of application shall be not less than 0.20 liter nor more than 0.70 liter per square meter.

3.3.2 Bituminous Prime Coat

A prime coat will be required if it will be at least seven days before a the surfacing (Asphalt cement hot mix concrete) layer is constructed on the underlying (base course, etc) compacted material. The type of liquid asphalt and application rate will be as specified herein. The Contractor shall protect the underlying from any damage (water, traffic, etc.) until the surfacing is placed. If the Contractor places the surfacing within seven days, the choice of protection measures or actions to be taken is at the Contractor's option. Damage to the underlying material caused by lack of, or inadequate, protection shall be repaired (recompacted or replaced) by approved methods at no additional cost to the Government. If the Contractor options to use the prime coat, it shall be applied as soon as possible after consolidation of the underlying material. Rate of application shall be not less than 0.70 liters nor more than 1.80 liters per square meter. To obtain uniform application of the prime coat on the surface treated at the junction of previous and subsequent applications, building paper shall be spread on the surface for a sufficient distance back from the ends of each application to start and stop the prime coat on the paper. Immediately after application, the building paper shall be removed and destroyed. Prime coat shall be allowed to cure without being disturbed for a period of at least 48 hours or longer, as may be necessary to attain penetration into the treated course.

3.4 PORTLAND CEMENT CONCRETE PAVEMENT

Except as otherwise specified herein, portland cement concrete shall be constructed in accordance with the requirements specified in Section 412, "PORTLAND CEMENT CONCRETE PAVEMENT", and Section 601, "STRUCTURAL CONCRETE" of the CDOT. Tining and stationing of concrete is not required.

3.4.1 Spreading

Spreading shall be by machine or hand method. Hand spreading will be permitted only when approved for odd widths or shapes of slabs, or for placement of separate, isolated slabs during removal and replacement type repair operations, or for lanes 15 m or less in length. Hand spreading, where permitted, shall be done with shovels; rakes shall not be used. Where the concrete is delivered to the form in truck mixers, suitable chutes may be used, provided windrows cover essentially the entire area within the form. In no case shall dumping of concrete in piles be permitted.

3.4.2 Placing Reinforcing Steel

Reinforcement shall be positioned on suitable chairs securely fastened to the subgrade prior to concrete placement, or may be placed on an initial layer of consolidated concrete, with the subsequent layer placed within 30 minutes of the first layer placement.

3.4.3 Joints

Transverse and longitudinal contraction joints shall be of the weakened plane type and shall be formed by sawing. Joints shall be sealed with hot-applied or cold-applied sealant immediately following curing of the concrete or as soon thereafter as weather conditions permit. Before sealing operations commence, a copy of the Manufacturer's Recommendations pertaining to the storage, heating and application of the sealant shall be submitted to the Contracting Officer.

3.4.4 Contractor Quality Control

The Contractor shall perform the inspection and tests described below at the placement and, based upon the results of these inspections and tests, shall take the action required and submit reports as specified. When, in the opinion of the Contracting Officer, the paving operation is out of control, concrete placement shall cease. The Contractor shall furnish all materials, labor, and facilities required for molding, curing, testing, and protecting test specimens at the site and in the laboratory.

3.4.4.1 Air Content Testing

Air content tests shall be made when test specimens are fabricated. In addition, at least two other tests for air content shall be made on randomly selected batches of each separate concrete mixture produced during each 8-hour period of paving. All air content measurements shall be determined in accordance with ASTM C 231. Whenever air content reaches specified limits, an immediate confirmatory test shall be made. If the second test also shows air content at or exceeding specified limits, an adjustment shall immediately be made in the amount of air-entraining admixture batched to bring air content within specified limits. If the next adjusted batch of concrete is not within specified limits, concrete placement shall be halted until concrete air content is within specified limits.

3.4.4.2 Slump Testing

Slump tests shall be made when test specimens are fabricated. Additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government inspector. All slump tests shall be made in accordance with ASTM C 143. Whenever slump approaches the maximum limit, an adjustment shall immediately be made in the batch masses of water and fine aggregate. When a slump result exceeds the specification limit, no further concrete shall be delivered to the paving site until adjustments have been made and slump is again within the limit.

3.4.4.3 Temperature

The temperature of the concrete shall be measured when strength specimens are fabricated.

3.4.4.4 Concrete Strength Testing

Four (4) cylinders from the same batch shall be fabricated, cured and tested for compressive strength, testing two cylinders at 7-day and two cylinders at 28-day age. A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days. A minimum of one set of four (4) cylinders shall be fabricated, cured and tested for each shift of concrete placement nor less than once for each 200 cubic meters of concrete or fraction thereof. All test cylinders shall be 150 by 300 mm cylinders and shall be fabricated in

accordance with ASTM C 192/C 192M, using only steel molds, cured in accordance with ASTM C 31/C 31M, and tested in accordance with ASTM C 39. Control charts for strength, showing the 7-day and 28-day CQC compressive strengths, and the 28-day required compressive strength, shall be maintained and submitted with weekly CQC Reports.

3.4.5 Acceptability of Work

The pavement will be accepted on the basis of tests made by the Contractor or its suppliers, as specified herein. The Government may, at its discretion, make check tests to validate the results of the Contractor's testing.

3.4.5.1 Strength Requirements

A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days. The strength of the concrete will be considered satisfactory so long as the running average of all sets of three consecutive test results equals or exceeds the specified 28-day field compressive strength and no individual test result falls below the specified strength by more than 3.5 MPa. The Contractor shall furnish all materials, labor, and facilities required for molding, curing, testing, and protecting test specimens at the site and in the laboratory.

3.4.5.2 Surface Smoothness Requirements

The surface of the pavement shall be tested with a 3 m (10 foot) straightedge to identify all surface irregularities exceeding the tolerances specified above. The entire area of the pavement shall be tested in both a longitudinal and a transverse direction on parallel lines approximately 4.5 m apart. The straightedge shall be held in contact with the surface and moved ahead one-half the length of the straightedge for each successive measurement. The amount of surface irregularity shall be determined by placing the straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length and measuring the maximum gap between the straightedge and the pavement surface, in the area between these two high points. The finished surfaces of the pavements shall have no abrupt change of 3 mm or more. All pavements shall have a surface smoothness tolerance within 6.5 mm in the transverse and longitudinal direction, except that roads and streets shall have tolerance of 5 mm in the longitudinal direction. In areas not meeting the specified limits for surface smoothness, high areas shall be reduced to attain the required smoothness, except as depth is limited below. High areas shall be reduced by grinding the hardened concrete with a surface grinding machine after the concrete is 14 days or more old. The depth of grinding shall not exceed 6 mm. All pavement areas requiring surface smoothness corrections in excess of the specified limits, shall be removed and replaced. All areas in which grinding has been performed will be subject to the thickness tolerances specified in paragraph Thickness. Any grinding performed on individual slabs with excessive deficiencies shall be performed at the Contractor's own decision without entitlement to additional compensation if eventual removal of the slab is required.

3.4.5.3 Edge Slump Testing and Conformance

When slip-form paving is used, not more than 15 percent of the total free edge [of any 255 mm or thicker slab] of the slipformed portion of the pavement, shall have an edge slump exceeding 6 mm and no slab shall have an

edge slump exceeding 9 mm. Edge slump shall be determined as above for surface smoothness, at each free edge of each slipformed paving lane constructed. Measurements shall be made at 1.5 to 4.5 m spacings, and as directed. When edge slump exceeding the limits specified above is encountered on either side of the paving lane, additional straightedge measurements shall be made, if required, to define the linear limits of the excessive slump. The concrete for the entire width of the paving lane within these limits of excessive edge slump shall be removed and replaced. Adding concrete or paste to the edge or otherwise manipulating the plastic concrete after the sliding form has passed, or patching the hardened concrete, shall not be used as a method for correcting excessive edge slump.

3.4.5.4 Thickness Determination

The thickness of the pavement shall be determined by the Government on the basis of measurements made on 100 mm diameter cores which shall be drilled by the Contractor, within 7 days after placement of the concrete. Cores shall be drilled at the points directed by the Contracting Officer and there shall be at least one core taken from each separate pavement areas of 3300 sq m or less. The Contractor shall fill the core holes with an approved non-shrink high strength grout. [For pavements less than 200 mm in thickness, when any core shows a deficiency in thickness greater than 6 mm, the pavement area represented by the core shall be removed and replaced by the Contractor at no cost to the Government.] [For pavements greater than 200 mm in thickness, when any core shows a deficiency in thickness greater than 13 mm, the pavement area represented by the core shall be removed and replaced by the Contractor at no cost to the Government.]

3.5 CONCRETE SIDEWALK AND CURB AND GUTTER

The subgrade shall be in a moist condition when concrete is placed. The subgrade shall be prepared and protected to produce a subgrade free from frost when the concrete is deposited. Forms shall be cleaned and coated with form oil each time before concrete is placed. Wood forms may, instead, be thoroughly wetted with water before concrete is placed, except that with probable freezing temperatures, oiling is mandatory.

3.5.1 Sidewalks

Except as otherwise specified herein, portland cement concrete sidewalk shall be constructed in accordance with Section 608, "SIDEWALKS AND BIKEWAYS" of the CDOT. Subgrade shall be placed and compacted in conformance with [Section 02300 EARTHWORK] [Section 02210 GRADING]. The subgrade shall be tested for grade and cross section by means of a template extending the full width of the sidewalk and supported between side forms. Finished surfaces shall not vary more than 8 mm from the testing edge of a 3 m straightedge. Permissible deficiency in section thickness will be up to 6 mm. All slab edges, including those at formed joints, shall be finished with an edger having a radius of 3 mm. Transverse joint shall be edged before brooming, and the brooming shall eliminate the flat surface left by the surface face of the edger. Sidewalk joints shall be constructed to divide the surface into square or rectangular areas. Spacing of transverse and longitudinal contraction and expansion joints shall be as indicated. At the end of the curing period, expansion joints shall be carefully cleaned and filled with cold-applied joint sealant (gray or stone color) as indicated on the drawings. The joint opening shall be thoroughly cleaned before the sealing material is placed. Sealing material shall not be spilled on exposed surfaces of the concrete. Concrete at the joint shall be surface dry and the atmospheric and concrete temperatures

shall be above 10 degrees C at the time of application of joint sealing material.

3.5.2 Curb and Gutter

Except as otherwise specified herein, portland cement concrete curb and gutter shall be constructed in accordance with Section 609, "CURB AND GUTTER", of the CDOT. The subgrade shall be tested for grade and cross section by means of a template extending the full width of the curb and gutter. Concrete shall be placed to the section required in a single lift.

Consolidation shall be achieved by using approved mechanical vibrators. Curve shaped gutters shall be finished with a standard curb "mule".

Approved slipformed curb and gutter machines may be used in lieu of hand placement. Exposed surfaces shall be floated and finished with a smooth wood float until true to grade and section and uniform in texture. The edges of the gutter and top of the curb shall be rounded with an edging tool to a radius as shown on the drawings. Finished surfaces shall not vary more than 6 mm from the testing edge of a 3 m straightedge.

Permissible deficiency in section thickness will be up to 6 mm.

Contraction joints shall be spaced so that monolithic sections between curb returns will not be less than 1.5 m nor greater than 4.5 m in length.

Contraction joints shall be constructed by means of 3 mm thick separators and of a section conforming to the cross section of the curb and gutter. Separators shall be removed as soon as practicable after concrete has set sufficiently to preserve the width and shape of the joint and prior to finishing. Expansion joints shall be formed by means of preformed expansion joint filler material cut and shaped to the cross section of curb and gutter. Expansion joints at least 13 mm in width shall be provided at intervals not exceeding 12 meters. Expansion joints and the top 25 mm depth of contraction joints shall be sealed with cold or hot-applied sealant immediately following curing of the concrete or as soon thereafter as weather permits. The joint opening shall be thoroughly cleaned before the sealing material is placed. Sealing material shall not be spilled on exposed surfaces of the concrete. Concrete at the joint shall be surface dry and the atmospheric and concrete temperatures shall be above 10 degrees C at the time of application of joint sealing material. Excess material on exposed surfaces of the concrete shall be removed immediately and concrete surfaces cleaned.

3.5.3 Curing and Protection

Concrete shall be protected against loss of moisture and rapid temperature changes for at least 7 days from the beginning of the curing operation.

Concrete shall be cured using one of the following methods

3.5.3.1 Mat Method

The entire exposed surface shall be covered with 2 or more layers of burlap. Mats shall overlap each other at least 150 mm. The mat shall be thoroughly wetted with water prior to placing on concrete surface and shall be kept continuously in a saturated condition and in intimate contact with concrete for not less than 7 days.

3.5.3.2 Impervious Sheeting Method

The entire exposed surface shall be wetted with a fine spray of water and then covered with impervious sheeting material. Sheets shall be laid directly on the concrete surface with the light-colored side up and overlapped 300 mm when a continuous sheet is not used. The curing medium

shall not be less than 450 mm wider than the concrete surface to be cured, and shall be securely weighted down by heavy wood planks, or a bank of moist earth placed along edges and laps in the sheets. Sheets shall be satisfactorily repaired or replaced if torn or otherwise damaged during curing. The curing medium shall remain on the concrete surface to be cured for not less than 7 days.

3.5.3.3 Membrane Curing Method

A uniform coating of white-pigmented membrane-curing compound shall be applied to the entire exposed surface of the concrete as specified in Section 412.14, "Curing" of the CDOT.

3.6 AGGREGATE COURSES

Aggregate base course, subbase course, rigid pavement base course, and aggregate surface course shall conform to, and be constructed in accordance with, the requirements specified in Section 304, "AGGREGATE BASE COURSE" and Section 703.03, "AGGREGATE FOR BASES" of the CDOT, except as modified herein. The aggregate base course, subbase course, rigid pavement base course, and aggregate surface course shall be compacted to 100 percent of laboratory maximum density.

3.6.1 Acceptability of Work

The aggregate base course, subbase course, rigid pavement base course, and aggregate surface course will be accepted on the basis of tests made by the Contractor as specified herein. The Government may, at its discretion, make check tests to validate the results of the Contractor's testing.

3.6.1.1 In-Place Tests

One of each of the following tests shall be performed on samples taken from the placed and compacted aggregate course. Samples shall be taken and tested at the rates indicated for each layer of material placed.

a. Density tests shall be performed on every lift of material placed and at a frequency of one set of tests for every 250 square meters, or portion thereof, of completed area.

b. Sieve Analysis [including 0.02 mm size material] shall be performed on every lift of material placed and at a frequency of one test for every 1000 square meters, or portion thereof, of completed area for every 500 metric tons, or portion thereof, of material placed.

c. Liquid limit and plasticity index tests shall be performed at the same frequency as the sieve analysis.

3.6.1.2 Thickness

The total compacted thickness of the aggregate course shall be within 13 mm of the thickness indicated. Where the measured thickness is more than 13 mm deficient, such areas shall be corrected by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 13 mm thicker than indicated, the course shall be considered as conforming to the specified thickness requirements. Average job thickness shall be the average of all thickness measurements taken for the job, but shall be within 6 mm of the thickness indicated. The total thickness of the aggregate course shall be measured

at intervals in such a manner as to ensure one measurement for each 500 square meters of aggregate course. Measurements shall be made in 75 mm diameter test holes penetrating the aggregate course.

3.6.1.3 Smoothness

The surface of the top layer shall show no deviations in excess of 10 mm when tested with a 3 meter straightedge applied parallel with and at right angles to the centerline of the area to be paved. Measurements shall be taken in successive positions parallel to the centerline of the area to be paved. Measurements shall also be taken perpendicular to the centerline at 15 meter intervals. Deviations exceeding this amount shall be corrected by removing material and replacing with new material, or by reworking existing material and compacting it to meet these specifications.

-- End of Section --

PART C

Government Edited Technical Guide Specifications

Part C addresses government edited guide specifications (Technical) required to be placed in the 100% Design package. These specifications are fully edited and ready for use in the design. The Contractor will comply, supply and furnish all requirements in accordance with the specifications listed below. Note: for a listing of government edited guides (Administrative) see Section 01332: SUBMITTALS DURING DESIGN

13851 FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE
15951 DIRECT DIGITAL CONTROL FOR HVAC
16710 PREMISES DISTRIBUTION SYSTEM
16750 NURSE CALL SYSTEM
16770 PUBLIC ADDRESS SYSTEMS
16781 TELEVISION DISTRIBUTION SYSTEM (TVDS)

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PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI S3.41 (1990; R 1996) Audible Emergency Evacuation Signals

CODE OF FEDERAL REGULATIONS (CFR)

47 CFR 15 Radio Frequency Devices

FACTORY MUTUAL ENGINEERING AND RESEARCH (FM)

FM P7825a (1998) Approval Guide Fire Protection

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C62.41 (1991; R 1995) Surge Voltages in Low-Voltage AC Power Circuits

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (1999) National Electrical Code

NFPA 72 (1996; Errata Oct 96, Dec 96; TIA 96-1, 96-2, 96-3) National Fire Alarm Code

NFPA 90A (1996) Installation of Air Conditioning and Ventilating Systems

NFPA 1221 (1994) Installation, Maintenance and Use of Public Fire Service Communication Systems

UNDERWRITERS LABORATORIES (UL)

UL 6 (1997) Rigid Metal Conduit

UL 38 (1994; Rev Nov 1994) Manually Actuated Signaling Boxes for Use with Fire-Protective Signaling Systems

UL 228 (1997) Door Closers-Holders, With or Without Integral Smoke Detectors

UL 268	(1996; Rev thru Jun 1998) Smoke Detectors for Fire Protective Signaling Systems
UL 268A	(1998) Smoke Detectors for Duct Applications
UL 464	(1996; Rev May 1997) Audible Signal Appliances
UL 521	(1993; Rev Oct 1994) Heat Detectors for Fire Protective Signaling Systems
UL 632/ANSI C33.41	(1994; Rev Sep 1994) Electrically-Actuated Transmitters
UL 797	(1993; Rev thru Mar 1997) Electrical Metallic Tubing
UL 864	(1996) Control Units for Fire-Protective Signaling Systems
UL 1242	(1996; Rev Mar 1998) Intermediate Metal Conduit
UL 1971	(1995; Rev thru May 1997) Signaling Devices for the Hearing Impaired

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fire Alarm Reporting System; G, AE

Detail drawings, prepared and signed by a Registered Professional Engineer or a NICET Level 3 Fire Alarm Technician, consisting of a complete list of equipment and material, including manufacturer's descriptive and technical literature, catalog cuts, and installation instructions. Note that the contract drawings show layouts based on typical detectors. The Contractor shall check the layout based on the actual detectors to be installed and make any necessary revisions in the detail drawings. The detail drawings shall also contain complete wiring and schematic diagrams for the equipment furnished, equipment layout, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Detailed point-to-point wiring diagram shall be prepared and signed by a Registered Professional Engineer or a NICET Level 3 Fire Alarm Technician showing points of connection. Diagram shall include connections between system

devices, appliances, control panels, supervised devices, and equipment that is activated or controlled by the panel.

SD-03 Product Data

Storage Batteries; G, AE

Substantiating battery calculations for supervisory and alarm power requirements. Ampere-hour requirements for each system component and each panel component, and the battery recharging period shall be included.

Voltage Drop; GA

Voltage drop calculations for notification appliance circuits to indicate that sufficient voltage is available for proper appliance operation. Provide voltage drop calculations for all added and revised NAC circuits.

Special Tools and Spare Parts; G, AE

Spare parts data for each different item of material and equipment specified, not later than 3 months prior to the date of beneficial occupancy. Data shall include a complete list of parts and supplies with the current unit prices and source of supply and a list of the parts recommended by the manufacturer to be replaced after 1 year of service.

Technical Data and Computer Software; G, AE

Technical data which relates to computer software.

Training; G, AE

Lesson plans, operating instructions, maintenance procedures, and training data, furnished in manual format, for the training courses. The operations training shall familiarize designated government personnel with proper operation of the fire alarm system. The maintenance training course shall provide the designated government personnel adequate knowledge required to diagnose, repair, maintain, and expand functions inherent to the system.

Testing; GA

Fire Alarm Test Plan; GA

Fire alarm test plan shall be approved 90 days to performing system tests. The test plan shall be organized by specific subsystems and signed by a registered professional engineer or a NICET Level 4 Technician that it has been reviewed and complies with specified criteria. The fire alarm test plan shall consist of a system inspection and readiness checklist, detailed step-by-step test procedures which include all specified performance criteria, coded ID device-by-device test results data sheets, corresponding

coded ID device system layout drawings, NFPA 72 Certificate of Completion, and the NFPA 72 Inspection and Testing Forms used as guidelines and adapted as necessary for site specific installed fire alarm system. Test plan to include re-acceptance testing for the existing fire alarm system per NFPA 72. Sound level measurement data shall include dB readings 10' from annunciation device, room far corner annunciation device sound level measurements, and room ambient sound level measurements. All doors to be closed when taking sound level measurements. The test plan shall be in a hardbound cover identifying: the project name, location, date of submittal, name of the Contractor, and a general title indicating the specific area and type of work. Test plan to include proposed schedule for the testing of the fire alarm system; list of qualified manpower needed to perform the testing, list of equipment to be used to perform testing. Test result data sheets to include: date of testing, whom performed the test, whom witnessed the testing and document all major corrective action taken.

SD-06 Test Reports

Testing; GA

Test reports, in booklet form, showing field tests performed to prove compliance with the specified performance criteria, upon completion and testing of the installed system. Each test report shall document readings, test results and indicate the final position of controls. The Contractor shall include the NFPA 72 Certificate of Completion and NFPA 72 Inspection and Testing Form, with the approved Fire Alarm Test Plan's detailed test procedures, associated completed coded data sheets and corresponding coded system layout drawings.

SD-07 Certificates

Equipment; G, AE

Certified copies of current approvals or listings issued by an independent test lab if not listed by UL, FM or other nationally recognized testing laboratory, showing compliance with specified NFPA standards.

Qualifications; G, AE

Proof of qualifications for required personnel. The installer shall submit proof of experience for the Professional Engineer, fire alarm technician, and the installing company.

SD-10 Operation and Maintenance Data

Technical Data and Computer Software; G, AE

Six copies of operating manual outlining step-by-step procedures required for system startup, operation, and shutdown. The manual shall include the manufacturer's name, model number, service

manual, parts list, and complete description of equipment and their basic operating features. Six copies of maintenance manual listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guide. The manuals shall include conduit layout, equipment layout and simplified wiring, and control diagrams of the system as installed. The manuals shall include complete procedures for system revision and expansion, detailing both equipment and software requirements. Original and backup copies of all software delivered for this project shall be provided, on each type of media utilized. Manuals shall be approved prior to training.

1.3 GENERAL REQUIREMENTS

1.3.1 Standard Products

Notwithstanding Section 00700 Contract Clauses FAR 52.236-5, Material and Workmanship, the Fire Detection and Alarm System shall be manufactured by Honeywell System Technology in order that compatibility with the existing Schriever AFB Fire Detection and Alarm System is maintained. No other product will be acceptable. The Competition Advocate authorizes sole source procurement.

1.3.2 Nameplates

Major components of equipment shall have the manufacturer's name, address, type or style, voltage and current rating, and catalog number on a noncorrosive and nonheat-sensitive plate which is securely attached to the equipment.

1.3.3 Keys and Locks

Locks shall be keyed alike. Four keys for the system shall be provided.

1.3.4 Tags

Tags with stamped identification number shall be furnished for keys and locks.

1.3.5 Verification of Dimensions

After becoming familiar with details of the work, the Contractor shall verify dimensions in the field and shall advise the Contracting Officer of any discrepancy before performing the work.

1.3.6 Compliance

The fire detection and alarm system and the central reporting system shall be configured in accordance with NFPA 72; exceptions are acceptable as directed by the Contracting Officer. The equipment furnished shall be compatible and be UL listed, FM approved, or approved or listed by a nationally recognized testing laboratory in accordance with the applicable NFPA standards.

1.3.7 Qualifications

1.3.7.1 Engineer and Technician

a. Registered Professional Engineer with verification of experience and at least 4 years of current experience in the design of the fire protection and detection systems.

b. National Institute for Certification in Engineering Technologies (NICET) qualifications as an engineering technician in fire alarm systems program with verification of experience and current NICET certificate.

c. The Registered Professional Engineer may perform all required items under this specification. The NICET Fire Alarm Technician shall perform only the items allowed by the specific category of certification held.

1.3.7.2 Installer

The installing Contractor shall provide the following: NICET Fire Alarm Technicians to perform the installation of the system. A NICET Level 3 Fire Alarm Technician shall supervise the installation of the fire alarm system. NICET Level 2 or higher Fire Alarm Technician shall install and terminate fire alarm devices, cabinets and panels. An electrician or NICET Level 1 Fire Alarm Technician shall install conduit for the fire alarm system. The Fire Alarm technicians installing the equipment shall be factory trained in the installation, adjustment, testing, and operation of the equipment specified herein and on the drawings.

1.3.7.3 Design Services

Installations requiring designs or modifications of fire detection, fire alarm, or fire suppression systems shall require the services and review of a qualified fire protection engineer. For the purposes of meeting this requirement, a qualified fire protection engineer is defined as an individual meeting one of the following conditions:

- a. An engineer having a Bachelor of Science or Masters of Science Degree in Fire Protection Engineering from an accredited university engineering program, plus a minimum of 2 years' work experience in fire protection engineering.
- b. A registered professional engineer (P.E.) in fire protection engineering.
- c. A registered PE in a related engineering discipline and member grade status in the National Society of Fire Protection Engineers.
- d. An engineer with a minimum of 10 years' experience in fire protection engineering and member grade status in the National Society of Fire Protection Engineers.

1.4 SYSTEM DESIGN

1.4.1 Operation

The fire alarm and detection system shall be a complete, supervised fire alarm reporting system. The system shall be activated into the alarm mode by actuation of any alarm initiating device. The system shall remain in the alarm mode until the initiating device is reset and the fire alarm control panel is reset and restored to normal. Alarm initiating devices shall be connected to signal line circuits (SLC), Style 6, in accordance with NFPA 72. Alarm notification appliances shall be connected to notification appliance circuits (NAC), Style Z in accordance with NFPA 72. A looped conduit system shall be provided so that if the conduit and all conductors within are severed at any point, all IDC, NAC and SLC will remain functional. The conduit loop requirement is not applicable to the signal transmission link from the local panels (at the protected premises) to the Supervising Station (fire station, fire alarm central communication center). Textual, audible, and visual appliances and systems shall comply with NFPA 72. Fire alarm system components requiring power, except for the control panel power supply, shall operate on 24 Volts dc. Addressable system shall be microcomputer (microprocessor or microcontroller) based with a minimum word size of eight bits and shall provide the following features:

- a. Sufficient memory to perform as specified and as shown for addressable system.
- b. Individual identity of each addressable device for the following conditions: alarm; trouble; open; short; and appliances missing/failed remote detector - sensitivity adjustment from the panel for smoke detectors
- c. Capability of each addressable device being individually disabled or enabled from the panel.
- d. Each SLC shall be sized to provide 20 percent addressable expansion without hardware modifications to the panel.

1.4.2 Operational Features

The system shall have the following operating features:

- a. Monitor electrical supervision of IDC, SLC, and NAC. Smoke detectors shall not have combined alarm initiating and power circuits.
- b. Monitor electrical supervision of the primary power (ac) supply, battery voltage, placement of alarm zone module (card, PC board) within the control panel, and transmitter tripping circuit integrity.
- c. A trouble buzzer and trouble LED/LCD (light emitting diode/liquid crystal diode) to activate upon a single break, open, or ground fault condition which prevents the required normal operation of the system. The trouble signal shall also operate upon loss of primary power (ac) supply, low battery voltage, removal of alarm zone

module (card, PC board), and disconnection of the circuit used for transmitting alarm signals off-premises. A trouble alarm silence switch shall be provided which will silence the trouble buzzer, but will not extinguish the trouble indicator LED/LCD. Subsequent trouble and supervisory alarms shall sound the trouble signal until silenced. After the system returns to normal operating conditions, the trouble buzzer shall again sound until the silencing switch returns to normal position, unless automatic trouble reset is provided.

- d. A one person test mode. Activating an initiating device in this mode will activate an alarm for a short period of time, then automatically reset the alarm, without activating the transmitter during the entire process.
- e. A transmitter disconnect switch to allow testing and maintenance of the system without activating the transmitter but providing a trouble signal when disconnected and a restoration signal when reconnected.
- f. Evacuation alarm silencing switch which, when activated, will silence alarm devices, but will not affect the zone indicating LED/LCD nor the operation of the transmitter. This switch shall be over-ridden upon activation of a subsequent alarm from an unalarmed device and the NAC devices will be activated.
- g. Electrical supervision for circuits used for supervisory signal services (i.e., sprinkler systems, valves, etc.). Supervision shall detect any open, short, or ground.
- h. Confirmation or verification of all smoke detectors. The control panel shall interrupt the transmission of an alarm signal to the system control panel for a factory preset period. This interruption period shall be adjustable from 1 to 60 seconds and be factory set at 20 seconds. Immediately following the interruption period, a confirmation period shall be in effect during which time an alarm signal, if present, will be sent immediately to the control panel. Fire alarm devices other than smoke detectors shall be programmed without confirmation or verification.
- i. The fire alarm control panel shall provide supervised addressable relays for HVAC shutdown. An override at the HVAC panel shall not be provided.
- j. Provide one person test mode - Activating an initiating device in this mode will activate an alarm for a short period of time, then automatically reset the alarm, without activating the transmitter during the entire process.
- k. The fire alarm control panel shall provide the required monitoring and supervised control outputs needed to accomplish elevator recall.
- l. The fire alarm control panel shall monitor the fire sprinkler system, or other fire protection extinguishing system.

- m. The control panel and field panels shall be software reprogrammable to enable expansion or modification of the system without replacement of hardware or firmware. Examples of required changes are: adding or deleting devices or zones; changing system responses to particular input signals; programming certain input signals to activate auxiliary devices.

1.4.3 Alarm Functions

An alarm condition on a circuit shall automatically initiate the following functions:

- a. Transmission of signals over the fire reporting system network.
- b. Visual indications of the alarmed devices on the fire alarm control panel display and on the remote annunciators.
- c. Continuous sounding or operation of alarm notification appliances throughout the building as required by ANSI S3.41.
- d. Deactivation of the air handling units throughout the building.
- e. Shutdown of power to the data processing equipment in the alarmed area.

1.4.4 Primary Power

Operating power shall be provided as required by paragraph Power Supply for the System. Transfer from normal to emergency power or restoration from emergency to normal power shall be fully automatic and not cause transmission of a false alarm. Loss of ac power shall not prevent transmission of a signal via the fire reporting system upon operation of any initiating circuit.

1.4.5 Battery Backup Power

Battery backup power shall be through use of rechargeable, sealed-type storage batteries and battery charger.

1.4.6 Interface With Existing Fire Alarm Equipment

The equipment specified herein shall operate as an extension to an existing configuration. The new equipment shall be connected to the existing Honeywell XLS System on Base. New components shall be capable of merging with the existing configuration without degrading the performance of either system. The scope of the acceptance tests of paragraph Testing shall include aspects of operation that involve combined use of both new and existing portions of the final configuration.

1.3.7 Interface With other Equipment

Interfacing components shall be furnished as required to connect to subsystems or devices which interact with the fire alarm system, such as

supervisory or alarm contacts in suppression systems, operating interfaces for smoke control systems, door releases, etc.

1.4 TECHNICAL DATA AND COMPUTER SOFTWARE

Technical data and computer software (meaning technical data which relates to computer software) which is specifically identified in this project, and which may be defined/required in other specifications, shall be delivered, strictly in accordance with the CONTRACT CLAUSES, and in accordance with the Contract Data Requirements List, DD Form 1423. Data delivered shall be identified by reference to the particular specification paragraph against which it is furnished. Data to be submitted shall include complete system, equipment, and software descriptions. Descriptions shall show how the equipment will operate as a system to meet the performance requirements of this contract. The data package shall also include the following:

- (1) Identification of programmable portions of system equipment and capabilities.
- (2) Description of system revision and expansion capabilities and methods of implementation detailing both equipment and software requirements.
- (3) Provision of operational software data on all modes of programmable portions of the fire alarm and detection system.
- (4) Description of Fire Alarm Control Panel equipment operation.
- (5) Description of auxiliary and remote equipment operations.
- (6) Library of application software.
- (7) Operation and maintenance manuals as specified in SD-19 of the Submittals paragraph.

1.6 DELIVERY AND STORAGE

Equipment delivered and placed in storage shall be stored with protection from the weather, humidity and temperature variation, dirt, dust, and any other contaminants.

PART 2 PRODUCTS

2.1 CONTROL PANEL

Control Panel shall comply with the applicable requirements of UL 864. Panel shall be modular, installed in a surface mounted steel cabinet with hinged door and cylinder lock. Control panel shall be a clean, uncluttered, and orderly assembled panel containing components and equipment required to provide the specified operating and supervisory functions of the system. The panel shall have prominent rigid plastic, phenolic or metal identification plates for LED/LCDs, zones, SLC, controls, meters, fuses, and switches. Nameplates for fuses shall also include ampere rating. The LED/LCD displays shall be located on the exterior of the cabinet door or be visible through the cabinet door. Control panel switches shall be within

the locked cabinet. A suitable means (single operation) shall be provided for testing the control panel visual indicating devices (meters or LEDs/LCDs). Meters and LEDs shall be plainly visible when the cabinet door is closed. Signals and LEDs/LCDs shall be provided to indicate by zone any alarm, supervisory or trouble condition on the system. Loss of power, including batteries, shall not require the manual reloading of a program. Upon restoration of power, startup shall be automatic, and shall not require any manual operation. The loss of primary power or the sequence of applying primary or emergency power shall not affect the transmission of alarm, supervisory or trouble signals. Visual annunciation shall be provided for LED/LCD visual display as an integral part of the control panel and shall identify with a word description and id number each device. Cabinets shall be provided with ample gutter space to allow proper clearance between the cabinet and live parts of the panel equipment. If more than one modular unit is required to form a control panel, the units shall be installed in a single cabinet large enough to accommodate units. Cabinets shall be painted red.

2.1.1.1 Remote System Audible/Visual Display

Audible appliance shall have a minimum sound level output rating of 85 dBA at 3.05 m and operate in conjunction with the panel integral display. The audible device shall be silenced by a system silence switch on the remote system. The audible device shall be silenced by the system silence switch located at the remote location, but shall not extinguish the visual indication. The remote LED/LCD visual displays shall provide minimum of 80 character identification, consisting of the word description and ID number with fire zone number for each device as displayed on the control panel. A rigid plastic, phenolic or metal identification sign which reads "Fire Alarm System Remote Display" shall be provided at the remote audible/visual display. The remote visual appliance located with the audible appliance shall not be extinguished until the trouble or alarm has been cleared.

2.1.1.1.1 Remote Graphic Panel

Provide new Graphic Panels mounted adjacent to new remote audible, visual LED/LCD annunciators. Graphic Panel to consist of a semi-flush mounted metal framed safety glass enclosure to house as-built fire detection floor plan. Fire detection floor plan to be laminated in plastic. Fire detection floor plan to show the entire building (new and existing) with room outlines. Floor plan to show room numbers, corresponding room description, and fire alarm system device locations by symbols. Floor plan to include a "You Are Here" designation and fire alarm symbol schedule. Floor plan scale shall be minimum of 1/8 inch = 1 foot, and have readable text. Both graphic panel's fire detection floor plans shall be submitted and receive approval action before posting.

2.1.2 Circuit Connections

Circuit conductors entering or leaving the panel shall be connected to screw-type terminals with each conductor and terminal marked for identification.

2.1.3 System Expansion and Modification Capabilities

Any equipment and software needed by qualified technicians to implement future changes to the fire alarm system shall be provided as part of this contract.

2.1.4 Addressable Control Module

The control module shall be capable of operating as a relay (dry contact form C) for interfacing the control panel with other systems. The module shall be UL listed as compatible with the control panel. The indicating device or the external load being controlled shall be configured as a Style Z notification appliance circuits. The system shall be capable of supervising, audible, visual and dry contact circuits. The control module shall have both an input and output address. Addressable control modules and monitor modules shall be labeled with device ID number and zone number. The supervision shall detect a short on the supervised circuit and shall prevent power from being applied to the circuit. The control model shall provide address setting means compatible with the control panel's SLC supervision and store an internal identifying code. The control module shall contain an integral LED that flashes each time the control module is polled.

2.1.5 Addressable Initiating Device Circuits Module

The initiating device being monitored shall be configured as a Style B initiating device circuits. The system shall be capable of defining any module as an alarm module and report alarm trouble, loss of polling, or as a supervisory module, and reporting supervisory short, supervisory open or loss of polling. The module shall be UL listed as compatible with the control panel. The monitor module shall provide address setting means compatible with the control panel's SLC supervision and store an internal identifying code. Monitor module shall contain an integral LED that flashes each time the monitor module is polled. Pull stations with a monitor module in a common backbox are not required to have an LED. Monitor modules shall be labeled on the exterior face with device ID number and fire zone ID number.

2.2 STORAGE BATTERIES

Storage batteries shall be provided and shall be 24 Vdc sealed, lead-calcium type requiring no additional water. The batteries shall have ample capacity, with primary power disconnected, to operate the fire alarm system for a period of 72 hours. Following this period of battery operation, the batteries shall have ample capacity to operate all components of the system, including all alarm signaling devices in the total alarm mode for a minimum period of 15 minutes. Batteries shall be located in a separate battery cabinet. Batteries shall be provided with overcurrent protection in accordance with NFPA 72. Separate battery cabinets shall have a lockable, hinged cover similar to the fire alarm panel. The lock shall be keyed the same as the fire alarm control panel. Cabinets shall be painted to match the fire alarm control panel.

2.3 BATTERY CHARGER

Battery charger shall be UL listed for fire alarm applications, have low voltage supervision feature and completely automatic, 24 Vdc with high/low charging rate, capable of restoring the batteries from full discharge (18 Volts dc) to full charge within 48 hours. A pilot light indicating when batteries are manually placed on a high rate of charge shall be provided as part of the unit assembly, if a high rate switch is provided. Charger shall be located in control panel cabinet or in a separate battery cabinet.

2.4 ADDRESSABLE MANUAL FIRE ALARM STATIONS

Addressable manual fire alarm stations shall conform to the applicable requirements of UL 38. Manual stations shall be connected into signal line circuits. Stations shall be installed on semi-flush mounted outlet boxes. Stations shall be single action type. Stations shall be finished in red, with raised letter operating instructions of contrasting color. Stations requiring the breaking of glass or plastic panels for operation are not acceptable. Stations employing glass rods are acceptable. The use of a key or wrench shall be required to reset the station. Gravity or mercury switches are not acceptable. Switches and contacts shall be rated for the voltage and current upon which they operate. Addressable pull stations shall be capable of being field programmed, shall latch upon operation and remain latched until manually reset. Stations shall have a separate screw terminal for each conductor. Surface mounted boxes shall be matched and painted the same color as the fire alarm manual stations. Addressable pull stations to be labeled on the outside face of the device with its fire zone and unique device number. Labeled device number shall match the fire alarm panel and remote LCD readouts.

2.5 FIRE DETECTING DEVICES

Fire detecting devices shall comply with the applicable requirements of NFPA 72, NFPA 90A, UL 268, UL 268A, and UL 521. The detectors shall be provided as indicated. Detector base shall have screw terminals for making connections. No solder connections will be allowed. Detectors located in concealed locations (above ceiling, raised floors, etc.) shall have a remote visible indicator LED/LCD. Addressable fire detecting devices, except flame detectors, shall be dynamically supervised and uniquely identified in the control panel. All fire alarm initiating devices shall be individually addressable. Addressable fire detecting devices shall be labeled on the outside face of the device and corresponding remote indicator with its fire zone and unique device number. Labeled device number shall match the fire alarm panel and remote LCD readouts. Installed devices shall conform to NFPA 70 hazard classification of the area where devices are to be installed.

2.5.1 Smoke Detectors

Smoke detectors shall be designed for detection of abnormal smoke densities. Smoke detectors shall be photoelectric type. Detectors shall contain a visible indicator LED/LCD that shows when the unit is in alarm condition. Detectors shall not be adversely affected by vibration or pressure. Detectors shall be the plug-in type in which the detector base contains terminals for making wiring connections. Detectors that are to be installed in concealed (above false ceilings, etc.) locations shall be provided with a

remote indicator LED/LCD suitable for mounting in a finished, visible location.

2.5.1.1 Photoelectric Detectors

Detectors shall operate on a light scattering concept using an LED light source. Failure of the LED shall not cause an alarm condition. Detectors shall be factory set for sensitivity and shall require no field adjustments of any kind. Detectors shall have an obscuration rating in accordance with UL 268. Addressable smoke detectors shall be capable of having the sensitivity being remotely adjusted by the control panel. Addressable photoelectric detectors shall be labeled on the outside face of the device and corresponding remote indicator with its fire zone and unique device number. Labeled device number shall match the fire alarm panel and remote LCD readouts.

2.5.1.2 Duct Detectors

Addressable automatic duct-mounted photoelectric smoke detectors shall be furnished and installed where indicated and in accordance with NFPA 90A. Units shall consist of a smoke detector as specified in paragraph Photoelectric Detectors, mounted in a special housing fitted with duct sampling tubes. Provide recessed adjustable screw to permit regulation of air flow, design to allow easy detector removal for cleaning or service without removing entire unit from duct. Detector circuitry shall be mounted in a metallic enclosure exterior to the duct. Detectors shall have a manual reset. Detectors shall be rated for air velocities that include air flows between 2.5 and 20 m/s. Detectors shall be powered from the fire alarm panel. Sampling tubes shall run the full width of the duct. Duct accessories: non-corrosive construction with pre-cut keyed air-sampling tubes, suitable for mounting detector either perpendicular or parallel to ducts. The duct detector package shall conform to the requirements of NFPA 90A, UL 268A, and shall be UL listed for use in air-handling systems. The control functions, operation, reset, and bypass shall be controlled from the fire alarm control panel. Lights to indicate the operation and alarm condition; and the test and reset buttons shall be visible and accessible with the unit installed and the cover in place. Detectors mounted above 1.83 m and those mounted below 1.83 m that cannot be easily accessed while standing on the floor, shall be provided with a remote detector indicator panel containing test and reset switches. Provide 8" square access door with rubber gasket in duct approximately 2" upstream from smoke detector for testing and service. Remote lamps and switches as well as the affected fan units shall be properly identified in etched plastic placards. Detectors shall have auxiliary contacts to provide control, interlock, and shutdown functions specified in Section 15950 HEATING, VENTILATING AND AIR CONDITIONING (HVAC) CONTROL SYSTEMS. The detectors shall be supplied by the fire alarm system manufacturer to ensure complete system compatibility. Addressable duct detectors shall be labeled on the outside face of the device and corresponding remote indicator with its fire zone and unique device number. Labeled device number shall match the fire alarm panel and remote LCD readouts.

2.6 NOTIFICATION APPLIANCES

Audible appliances shall conform to the applicable requirements of UL 464. Devices shall be connected into notification appliance circuits. Devices shall have a separate screw terminal for each conductor. Audible appliances shall generate a unique audible sound from other devices provided in the building and surrounding area. Surface mounted audible appliances shall be painted white. Recessed audible appliances shall be installed with a grill that is painted white. Strobes shall meet the requirements of ADA.

2.6.1 Alarm Horns

Horns shall be surface mounted with the matching mounting back box recessed vibrating type suitable for use in an electrically supervised circuit. Horns shall produce a sound rating of at least 85 dBA at 3.05 m. Horns used in exterior locations shall be specifically listed or approved for outdoor use and be provided with metal housing and protective grilles.

2.6.4 Visual Notification Appliances

Visual notification appliances shall conform to the applicable requirements of UL 1971 and the contract drawings. Appliances shall have clear high intensity optic lens, xenon flash tubes, and output white light. Strobe shall be semi-flush mounted. Strobes shall meet the requirements of ADA.

2.6.5 Combination Audible/Visual Notification Appliances

Combination audible/visual notification appliances shall provide the same requirements as individual units except they shall mount as a unit in standard backboxes. Units shall be factory assembled. Any other audible notification appliance employed in the fire alarm systems shall be approved by the Contracting Officer.

2.7 REMOTE ANNUNCIATION EQUIPMENT

2.7.1 Remote Graphic Annunciator

Graphic annunciator shall have a plan view of the building. Each initiating device (identical devices in the same room may be combined, as approved) shall be indicated by an LED shown in its relative position in the building and shall illuminate for abnormal condition in that area. LEDs shall be red for alarm condition, yellow for supervisory malfunction condition, and amber for trouble condition. Plan views shall be approximately to scale and in no case smaller than 300 mm in length or width. Annunciator shall have a door with piano hinge and two point cylinder lock or two cylinder locks. Lock shall be operable using the same key as the control panel. Annunciator shall contain a LED test switch, audible trouble signal and a trouble switch to silence the audible alarm, but not extinguish the trouble LED. Annunciator shall be flush mounted.

2.8 FIRE DETECTION AND ALARM SYSTEM PERIPHERAL EQUIPMENT

2.8.1 Conduit

Conduit and fittings shall comply with NFPA 70, UL 6, UL 1242, and UL 797.

2.8.2 Wiring

Wiring shall conform to NFPA 70. Wiring for 120 Vac power shall be No. 12 AWG minimum. The SLC wiring shall be copper cable in accordance with the manufacturers requirements. Wiring for fire alarm dc circuits shall be No. 14 AWG minimum. Voltages shall not be mixed in any junction box, housing, or device, except those containing power supplies and control relays. Wiring shall conform to NFPA 70. System field wiring shall be solid copper and installed in metallic conduit or electrical metallic tubing, except that rigid plastic conduit may be used under slab-on-grade. Conductors shall be color coded. Conductors used for the same functions shall be similarly color coded. Wiring code color shall remain uniform throughout the circuit. Pigtail or T-tap connections to initiating device circuits, supervisory alarm circuits, and notification appliance circuits are prohibited. T-tapping using screw terminal blocks is allowed for style 5 addressable systems. The use of wire nut type of connectors in the fire alarm system is prohibited. Connections and splices shall be made using screw terminal blocks.

2.8.3 Special Tools and Spare Parts

Software, connecting cables and proprietary equipment, necessary for the maintenance, testing, and reprogramming of the equipment shall be furnished to the Contracting Officer. Two spare fuses of each type and size required shall be furnished. Two percent of the total number of each different type of detector, but no less than two each, shall be furnished. Spare fuses shall be mounted in the fire alarm panel.

PART 3 EXECUTION

3.1 INSTALLATION

All work shall be installed as shown and in accordance with the manufacturer's diagrams and recommendations, unless otherwise specified. Smoke detectors shall not be installed until construction is essentially complete and the building has been thoroughly cleaned. Detector plastic dust cover caps shall be left on until construction dust has been removed from the entire facility. All alarm initiating devices shall be individually addressable and report back to fire alarm panel, and remote annunciators with their unique address, room location and corresponding fire alarm zone as shown on the graphic panel.

3.1.1 Power Supply for the System

A single dedicated circuit connection for supplying power from a branch circuit to each building fire alarm system shall be provided. The power shall be supplied as shown on the drawings. The power supply shall be equipped with a locking mechanism and marked in red with the words "FIRE ALARM CIRCUIT CONTROL."

3.1.2 Wiring

Conduit size for wiring shall be in accordance with NFPA 70. Wiring for the fire alarm system shall not be installed in conduits, junction boxes, or outlet boxes with conductors of lighting and power systems. Not more than two conductors shall be installed under any device screw terminal. The wires under the screw terminal shall be straight when placed under the terminal then clamped in place under the screw terminal. The wires shall be broken and not twisted around the terminal. Circuit conductors entering or leaving any mounting box, outlet box enclosure, or cabinet shall be connected to screw terminals with each terminal and conductor marked in accordance with the wiring diagram. Connections and splices shall be made using screw terminal blocks. All circuit conductors entering or leaving any mounting box, outlet box enclosure or cabinet shall be connected to screw terminals, with each terminal marked in accordance with the wiring diagram. J-boxes shall be upsized as necessary for the extra space needed to accommodate the use of screw type terminal blocks. Wiring within any control equipment shall be readily accessible without removing any components' parts. All conduit J-box covers must be painted red and have the words "Fire Alarm" identified on the exterior surface. The fire alarm equipment manufacturer's representative shall be present and supervise the connection of wiring to and from the fire alarm control panel.

3.1.3 Control Panel

The control panel and its assorted components shall be mounted so that no part of the enclosing cabinet is less than 300 mm nor more than 2000 mm above the finished floor. Manually operable controls shall be between 900 and 1100 mm above the finished floor. Panel shall be installed to comply with the requirements of UL 864.

3.1.4 Detectors

Detectors shall be located and installed in accordance with NFPA 72. Detectors shall be connected into signal line circuits or initiating device circuits as indicated on the drawings. Detectors shall be at least 300 mm from any part of any lighting fixture. Detectors shall be located at least 900 mm from diffusers of air handling systems. Each detector shall be provided with appropriate mounting hardware as required by its mounting location. Detectors which mount in open space shall be mounted directly to the end of the stubbed down rigid conduit drop. Conduit drops shall be firmly secured to minimize detector sway. Where length of conduit drop from ceiling or wall surface exceeds 900 mm, sway bracing shall be provided. Addressable detectors and corresponding remote visible indicators shall be labeled on the outside face of the detector and remote indicator with its fire zone and unique device number. Labeled device number shall match the fire alarm panel and remote LCD readouts.

3.1.5 Annunciator Equipment

Annunciator equipment shall be mounted where indicated on the drawings.

3.1.6 Addressable Initiating Device Circuits Module

The initiating device circuits module shall be used to connect supervised conventional initiating devices (water flow switches, water pressure switches, manual fire alarm stations, high/low air pressure switches, and tamper switches). The module shall mount in an electrical box adjacent to or connected to the device it is monitoring and shall be capable of Style B supervised wiring to the initiating device. In order to maintain proper supervision, there shall be no T-taps allowed on style B lines. Addressable initiating device circuits modules shall monitor only one initiating device each. Contacts in suppression systems and other fire protection subsystems shall be connected to the fire alarm system to perform supervisory and alarm functions as specified in NFPA 72, as indicated on the drawings and as specified herein. Addressable modules shall be labeled on the outside face of the device and corresponding device's exterior face for easy visual identification with its fire zone and unique device number. Labeled device number shall match the fire alarm panel and remote LCD readouts.

3.1.7 Addressable Control Module

Addressable and control modules shall be installed in the outlet box or adjacent to the device they are controlling. If a supplementary suppression releasing panel is provided, then the monitor modules shall be mounted in a common enclosure adjacent to the suppression releasing panel and both this enclosure and the suppression releasing panel shall be in the same room as the releasing devices. All interconnecting wires shall be supervised unless an open circuit or short circuit abnormal condition does not affect the required operation of the fire alarm system. If control modules are used as interfaces to other systems, such as HVAC or elevator control, they shall be within the control panel or immediately adjacent to it. Control modules that control a group of notification appliances shall be adjacent to the first notification appliance in the notification appliance circuits. Control modules that connect to devices shall supervise the notification appliance circuits. Control modules that connect to auxiliary systems or interface with other systems (non-life safety systems) and where not required by NFPA 72, shall not require the secondary circuits to be supervised. Contacts in suppression systems and other fire protection subsystems shall be connected to the fire alarm system to perform required alarm functions as specified in NFPA 72, as indicated on the drawings and as specified herein. Addressable duct detectors shall be labeled on the outside face of the device and corresponding device's exterior face for easy visual identification with its fire zone and unique device number. Labeled device number shall match the fire alarm panel and remote LCD readouts.

3.2 OVERVOLTAGE AND SURGE PROTECTION

3.2.1 Power Line Surge Protection

All equipment connected to alternating current circuits shall be protected from surges per IEEE C62.41 B3 combination waveform and NFPA 70. Fuses shall not be used for surge protection. The surge protector shall be rated for a maximum let thru voltage of 350 Volts ac (line-to-neutral) and 350 Volt ac (neutral-to-ground).

3.2.2 Low Voltage DC Circuits Surge Protection

All IDC, except fiber optics, shall have surge protection installed at each point where it exits or enters a building. Equipment shall be protected from surges per IEEE C62.41 B3 combination waveform and NFPA 70. The surge protector shall be rated to protect the 24 Volt dc equipment. The maximum dc clamping voltages shall be 36 V (line-to-ground) and 72 Volt dc (line-to-line).

3.2.3 Signal Line Circuit Surge Protection

All SLC cables/conductors, except fiber optics, shall have surge protection/isolation circuits installed at each point where it exits or enters a building. The circuit shall be protected from surges per IEEE C62.41 B3 combination waveform and NFPA 70. The surge protector/isolator shall be rated to protect the equipment.

3.3 GROUNDING

Grounding shall be provided by connecting to building ground system.

3.4 SUPERVISING STATION PROVISIONS

3.4.1 Revisions to Existing Facilities

Existing supervising components shall be modified as indicated on the drawings and programming shall be updated if required to accommodate the revised configuration. Acceptance testing shall include procedures that would demonstrate that operation of existing equipment has not been degraded and that the revised configuration plus interfacing components operates compatibly with the new fire alarm system at the protected premises. Work on existing equipment shall be performed in accordance with the manufacturer's instructions or under supervision of the manufacturer's representative.

3.4.2 Additions to Existing Facilities

Supplemental components shall be added to the existing supervising equipment as required to accommodate the new fire alarm system to be installed at the protected premises. All present functions shall be extended, including recording and storage in memory, and programming shall be updated if required to accommodate the revised configuration. Acceptance testing shall include procedures that would demonstrate that operation of existing equipment has not been degraded and that the expanded configuration operates compatibly with the new fire alarm system.

3.5 TESTING

The Contractor shall notify the Contracting Officer at least 30 days before the preliminary and acceptance tests are to be conducted. The tests shall be performed in accordance with the approved fire alarm test plan in the presence of representatives of the Contracting Officer and the Fire Department. The control panel manufacturer's representative shall be present to supervise tests. The Contractor shall furnish instruments and personnel required for the tests.

3.5.1 Preliminary Tests

Upon completion of the installation, the system shall be subjected to functional and operational performance tests including tests of each installed initiating and notification appliance, when required. Tests shall include the meggering of system conductors to determine that the system is free from grounded, shorted, or open circuits. The megger test shall be conducted prior to the installation of fire alarm equipment. If deficiencies are found, corrections shall be made and the system shall be retested to assure that it is functional. After completing the preliminary testing, the Contractor shall complete and submit the NFPA 72, Certificate of Completion, for approval and any schedule changes to previously submitted dates for final acceptance fire alarm testing.

3.5.2 Acceptance Test

Acceptance testing shall not be performed until the Contractor has completed, submitted, and received approval of the Certificate of Completion and finished all four (4) days of training. Testing shall be in accordance with all requirements of NFPA 72, all specified performance criteria, approved fire alarm test plan and not limited to, but including, the following:

- a. Test each function of the fire alarm control panel.
- b. Test each SLC per requirements of NFPA 72, Table 3-6, Performance of Signal Line Circuits Style 6, Abnormal Conditions A through G, for trouble and alarm receipt capability during abnormal conditions.
- c. Test each IDC per requirements of NFPA 72, Table 3-5, Performance of Initiating Device Circuits Style D (as indicated per spec), Abnormal Conditions A through C, for alarm, trouble, and alarm receipt capability during abnormal conditions.
- d. Test each NAC per requirements of NFPA 72, Table 3-7.1, Notification Appliance Circuits (NAC) Style Z (as indicated per spec), Abnormal Conditions; Single Open, Single Ground, and Wire-to-Wire Short, for trouble and alarm receipt capability during abnormal conditions.
- e. Tests of each control module, monitor module, etc.
- f. Tests of each alarm-initiating device.
- g. Tests of each alarm notification device. Sound level measurements at 10 feet, room far corner, and room ambient sound level, etc.
- h. Visual inspection of wiring connections, operation of smoke dampers, air handler shut down, operation of magnetic door holders, operation of strobes, etc.
- i. Test each circuit for reporting of ground fault to control panel.

- j. Measure for stray voltage on circuits.
- k. Measure loop resistance of circuits.
- l. Tests of battery charger and batteries.
- m. Complete operational tests of complete fire alarm system under emergency power.
- n. Complete operational test of the radio transmitter.
- o. Tests of remote annunciators.

3.6 TRAINING

Training course shall be provided for the operations and maintenance staff. The course shall be conducted in the building where the system is installed or as designated by the Contracting Officer. The training period for systems operation shall consist of 1 training days (8 hours per day) and shall start after the system is functionally completed but prior to final acceptance tests. The training period for systems maintenance shall consist of 1 training days (8 hours per day) and shall start after the system is functionally completed but prior to final acceptance tests. The instructions shall cover items contained in the operating and maintenance instructions. In addition, training shall be provided on performance of expansions or modifications to the fire detection and alarm system. The training period for system expansions and modifications shall consist of at least 1 training days (8 hours per day) and shall start after the system is functionally completed but prior to final acceptance tests.

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SECTION 15951

DIRECT DIGITAL CONTROL FOR HVAC

06/98

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SECTION 15951

DIRECT DIGITAL CONTROL FOR HVAC
06/98

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AIR MOVEMENT AND CONTROL ASSOCIATION (AMCA)

AMCA 500 (1994) Test Methods for Louvers, Dampers
and Shutters

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C12.1 (1995) Code for Electricity Metering

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING
ENGINEERS (ASHRAE)

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B40.1 (1991) Gauges - Pressure Indicating Dial
Type - Elastic Element

ELECTRONIC INDUSTRIES ASSOCIATION (EIA)

EIA ANSI/EIA/TIA 232-E (1991) Interface Between Data Technical
Equipment and Data Circuit-Terminating
Equipment Employing Serial Binary Data
Interchange

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C62.41 (1991; R 1995) Surge Voltages in
Low-Voltage AC Power Circuits

IEEE Std 142 (1991) IEEE Recommended Practice for
Grounding of Industrial and Commercial
Power Systems

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250 (1991) Enclosures for Electrical Equipment
(1000 Volts Maximum)

NEMA ICS 1 (1993) Industrial Control and Systems

NEMA ST 1 (1988) Specialty Transformers (Exept

General-Purpose Type)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(1999) National Electrical Code
NFPA 90A	(1996) Installation of Air Conditioning and Ventilating Systems

UNDERWRITERS LABORATORIES (UL)

UL 268A	(1993; Rev thru May 1997) Smoke Detectors for Duct Application
UL 508	(1993; Rev thru Oct 1997) Industrial Control Equipment

1.2 GENERAL REQUIREMENTS

The direct digital control (DDC) shall be a complete system suitable for the heating, ventilating and air-conditioning (HVAC) system and energy management and control system (EMCS), and mechanical equipment and shall be provided by HSQ Technology Inc. South San Francisco, California. The Contractor shall utilize the existing Operator Workstation located in the building 600, room 201. The system specified in this document is an extension of the existing HSQ Technology EMCS/DDC control system. HVAC shall be defined as all mechanical equipment identified on the contract drawings and herein listed.

a. HSQ Technology of California is the only acceptable manufacturer for DDC controllers, software, software programming, and graphic generation.

b. HSQ Technology Inc. shall provide this facility including software programming, graphics generation, and calibration. Provide and integrate graphic display screen files into the existing system, each consisting of a schematic diagram of a mechanical system with real-time statuses of new inputs and outputs superimposed upon the schematic diagram. In conjunction with existing software base packages, the screens shall allow an operator to not only view, but also command changes to the statuses of all outputs.

c. This Section contains instructions and engineering requirements for the design of the new building control systems required for the operation of the building mechanical systems identified on drawings.

d. The controls shall be compatible and fully integrated and connected to the Base HSQ Technology Inc. EMCS/DDC system by the Controls Contractor in this contract. The Controls Contractor shall be the sole source of responsibility for complete DDC/EMCS controls package. All controls shall be connected to the existing Workstation in Building 600 and graphics provided. End-to-end testing of the head-end computer and this project's remote DDC panels and temperature controls specified in this section shall be provided by the Controls Contractor.

(1) HSQ Technology, Inc. Subcontractor Work shall consist of providing the following portion of the building temperature control system:

a) DDC panel and Data Terminal Cabinet(s), complete with all equipment and devices necessary to provide the required control and

monitoring. Panels, equipment and devices shall be compatible with those previously provided by HSQ Technology, Inc. at Schriever AFB.

b) All programming required at the DDC panel.

c) All programming required at the head-end computer to accept the new facility, including graphics.

d) All testing necessary to demonstrate the proper operation of the entire building temperature control system, from the field devices to the head-end computer.

e) Coordination with the Testing and Balancing subcontractor, attend commissioning, and provide necessary support during endurance testing. Attendance at pre-final and final inspections of mechanical systems. Providing necessary training to BCE shop staff.

f) Oversight and recommendations of the HSQ system during the design, including review of the design and attendance at 60% and 100% design review meetings. All submittals for HSQ items.

g) All wiring, conduit, cabling and other appurtenant items exterior to the panels and cabinets, as well as all field input/output devices and instruments shall be performed as part of the Control Contractor's building bid.

h) The amount is for the HSQ subcontract only; any overhead, profit, or bond shall be included in the Control Contractor's building bid.

e. EMCS fiber shall be extended in accordance with electrical section 1007.

f. The control system shall be designed to provide continuous and automatic control of all mechanical equipment. Where equipment is provided with a packaged control system, such as in the case of a boilers, chillers, control systems will interface with the equipment's packaged control systems.

g. The EMCS control panels (DTC cabinets) shall be located in the mechanical room(s). The final number of EMCS control panels shall be dictated by the number of and types of equipment in the final design, one is typical sufficient. This type of control system(s) allows the building operator to easily adjust setpoint, operating times and other system parameters, if and when necessary, after the building has been occupied.

h. See the following HVAC control/EMCS point schedules drawings (including required graphics).

i. Fire alarm condition on any smoke detector or duct smoke detector shall automatically initiate the deactivation of the air handling units throughout the building as indicated on electrical drawings.

j. All computing devices, shall be as defined in FCC Rules and Regulations FCC Part 15, and shall be certified to comply with the requirements for Class B computing devices and labeled as set forth in FCC Rules and Regulations FCC Part 15.

k. Controls Contractor Experience - The controls Contractor shall have a working knowledge of HVAC control's systems and experience installing these systems. The Contractor shall provide for approval the names and

qualification of supervisory personnel (ie. Project Manager and /or Superintendent) that will be used on this project. The Contractor shall also provide a list of reference(s) to be contacted from recent projects on which the proposed personnel performed similar duties. Approval shall be based on previous experience with HSQ Technology systems or HVAC control's systems, qualifications and demonstrated ability of proposed personnel to manage resources in an efficient and effective manner. Experience and supervisory personnel qualifications must be submitted and approved before submittal of any shop drawing technical data.

l. Emergency Service - Service calls are covered under warrantee section and the responsibility of the controls sub-contractor.

m. Software - Updates to front-end are provided under annual service contract.

n. All utility meters shall be connected to the base EMCS system(s) to allow the necessary monitoring.

o. Fuses shall not be used for surge protection.

Standard Products

Material and equipment shall be the standard products of HSQ Technology or of other manufacturers as described herein, and each component shall provide the discrete functions indicated. Combining of components or discrete component functions by using multiple function devices which have not been indicated, and deviation from indicated logic shall not be permitted. Items of equipment (individual control system components such as pressure sensors, controllers, temperature probes) shall essentially duplicate equipment that has been in satisfactory use at least 2 years prior to bid opening. All equipment, including installation materials, shall conform to the requirements of the Buy American Act or shall be of American manufacture and assembly. Specific acceptable items of foreign manufacture are identified herein. Any equipment or material which does not meet these requirement shall be subject to removal and replacement at no additional cost to the Government.

Identical Items

Items of equipment that perform the same function shall be identical, including equipment, assemblies, parts, and components.

Configuration

The Contractor shall configure the Direct Digital Control (DDC) system as described and shown. System shall be listed per UL 916. Direct Digital Control panels shall be fully capable of controlling their respective systems with or without communication with any host computer system. All computing devices, as defined in FCC rules and Regulations, Part 15, shall be certified to comply with the requirements for Class B computing devices and labelled as set forth in FCC Rules and Regulations Part 15, Subpart J. The system shall provide operator interaction through the existing HSQ Technology workstation in building 600 local operators terminal. DDC panels shall manage all control functions within their data environment (DE) as specified. Every connected analog output (AO), analog input (AI), Binary output (BO), and Binary input (BI), represents a point where referred to in this specification.

Connection to Base-Wide EMCS/DDC System

The contractor shall be responsible for connection and integration of the Direct Digital Control (DDC) system to the existing base-wide HSQ Technology Energy Management and Control System (EMCS). This includes providing all equipment, cabling, software, programming, installation, commissioning, and training unless noted otherwise.

Database Definition and Graphic Generation

Contractor shall generate required database definitions compatible with the existing EMCS databases. They shall also generate complete and accurate dynamic graphics representations of each air handling unit system and all other systems as identified in the I/O summary charts as well as complete building floor plans showing individual space sensed and set point temperature and humidity conditions.

Extension of Base EMCS Fiber-optic Network

This section covers required network cabling and equipment in each building from communications patch panel, located in the communications room, to the existing Central Control Operator Workstation and Master DDC System Controller. Extension of EMCS' dedicated fiber-optic cable from nearest source to building's communications patch panel is provided under Electrical section and drawings.

Sole Source Requirement

Notwithstanding Section 00700 Contract Clauses FAR 52.236-5, Material and Workmanship, DDC controllers, software, software programming, and graphic generation shall be manufactured by HSA Technology in order that the systems installed are an HSQ Technology System, and fully integrated and connected to the existing Base HSQ Technology System. No other product will be acceptable. The Competition Advocate authorizes sole source procurement.

1.2.1 Nameplates, Lens Caps, and Tags

Nameplates and lens caps bearing legends as shown and tags bearing device-unique identifiers as shown shall have engraved or stamped characters. A plastic or metal tag shall be mechanically attached directly to each device or attached by a metal chain or wire. Each airflow measurement station shall have a tag showing flow rate range for signal output range, duct size, and identifier as shown.

1.2.2 Verification of Dimensions

After becoming familiar with all details of the work, the Contractor shall verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing any work.

1.2.3 Drawings

Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. The Contractor shall carefully investigate the mechanical, electrical, and finish conditions that could affect the work to be performed, shall arrange such work accordingly, and shall furnish all work necessary to meet such conditions.

1.2.4 Power-Line Surge Protection

Equipment connected to ac circuits shall be protected from power-line surges. Equipment protection shall meet the requirements of IEEE C62.41. Fuses shall not be used for surge protection.

1.2.5 Surge Protection for Transmitter and Control Wiring

DDC system control-panel equipment shall be protected against surges induced on control and transmitter wiring installed outside and as shown. The equipment protection shall be tested in the normal mode and in the common mode, using the following two waveforms:

a. A 10-microsecond by 1,000-microsecond waveform with a peak voltage of 1,500 volts and a peak current of 60 amperes.

b. An eight microsecond by 20-microsecond waveform with a peak voltage of 1,000 volts and a peak current of 500 amperes.

1.2.6 System Overall Reliability Requirement

The system shall be configured and installed to yield a mean time between failure (MTBF) of at least 40,000 hours. Each DDC controller shall be designed, configured, installed and programmed to provide for stand alone operation with minimal performance degradation on failure of other system components to which it is connected or with which it communicates.

1.2.7 DDC System Network Accessibility

Where the systems to be controlled by the DDC system are located in multiple mechanical rooms, each mechanical room shall have at least one communication port for the portable workstation/tester. DDC controllers shall be located in the same room as the equipment being controlled or in an adjacent space which has direct access to the equipment room.

1.2.8 System Accuracy and Display

The system shall maintain an end-to-end accuracy for one year from sensor to operator's console display for the applications specified and shall display the value as specified. Each temperature shall be displayed and printed to nearest 0.05 degree C.

1.2.8.1 Space Temperature

Space temperature with a range of 10 to 30 degrees C plus or minus 0.5 degrees C for conditioned space; minus 1 to plus 55 degrees C plus or minus 0.5 degrees C for unconditioned space.

1.2.8.2 Duct Temperature

Duct temperature with a range of 5 to 60 degrees C plus or minus 1 degree C.

1.2.8.3 Outside Air Temperature

Outside air (OA) temperature with a range of minus 35 to plus 55 degrees C plus or minus 1 degree C; with a subrange of minus 1 to plus 40 degrees C plus or minus 0.5 degree C.

1.2.8.4 Water Temperature

Water temperature with a range of minus 1 to plus 40 degrees C plus or minus 0.5 degree C; the range of 40 to 120 degrees C plus or minus 1 degree C; and water temperatures for the purpose of performing energy calculations using differential temperatures to plus or minus 0.5 degree C using matched sensors.

1.2.8.5 High Temperature

High temperature with a range of 100 to 260 degrees C plus or minus 1 degree C.

1.2.8.6 Relative Humidity

Relative humidity, within a range of 20 to 80 percent, plus or minus 6.0 percent of range (display and print to nearest 1.0 percent).

1.2.8.7 Pressure

Pressure with a range for the specific application plus or minus 2.0 percent of range (display and print to nearest kPa.)

1.2.8.8 Flow

Flow with a range for the specific application plus or minus 3.0 percent of range, and flows for the purpose of thermal calculations to plus or minus 2.0 percent of actual flow (display and print to nearest unit, such as liters per second.

1.2.8.9 KWh and kW Demand

KWh and kW demand with a range for the specific application plus or minus 1.0 percent of reading (display and print to nearest kWh or kW).

1.2.8.10 Analog Value Input

An analog value input to the system's equipment via an AI with a maximum error of 0.50 percent of range, not including the sensor or transmitter error. This accuracy shall be maintained over the specified environmental conditions.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Equipment Compliance Booklet; G-D1.

The HVAC Control System Equipment Compliance Booklet (ECB) shall be in booklet form and indexed, with numbered tabs separating the information on each device. It shall consist of, but not be limited to, data sheets and

catalog cuts which document compliance of all devices and components with the specifications. The ECB shall be indexed in alphabetical order by the unique identifiers. Devices and components which do not have unique identifiers shall follow the devices and components with unique identifiers and shall be indexed in alphabetical order according to their functional name. The ECB shall include a Bill of Materials for each HVAC Control System. The Bill of Materials shall function as the Table of Contents for the ECB and shall include the device's unique identifier, device function, manufacturer, model/part/catalog number used for ordering, and tab number where the device information is located in the ECB. The ECB shall be submitted along with Submittal SD-04, Drawings.

Training Course Materials; G-A.

An outline for the HVAC control system training course with a proposed time schedule. Approval of the planned training schedule shall be obtained from the Government at least 60 days prior to the start of the training. copies of HVAC control system training course material 30 days prior to the scheduled start of the training course. The training course material shall include the operation manual, maintenance and repair manual, and paper copies of overheads used in the course.

SD-02 Shop Drawings

HVAC Control System; G-D1.

Drawings shall be on A1 (841 by 594 mm) sheets in the form and arrangement shown. The drawings shall use the same abbreviations, symbols, nomenclature and identifiers shown. Each control system element on a drawing shall have a unique identifier as shown. The HVAC Control System Drawings shall be delivered together as a complete submittal. Deviations must be approved by the Contracting Officer. Drawings shall be submitted along with Submittal SD-01, Data.

a. HVAC Control System Drawings shall include the following:

Sheet One: Drawing Index, HVAC Control System Legend.
Sheet Two: Valve Schedule, Damper Schedule.
Sheet Three: Not Used.
Sheet Four: Control System Schematic and Equipment Schedule.
Sheet Five: Sequence of Operation and Data Terminal Strip Layout.
Sheet Six: Control Loop Wiring Diagrams.
Sheet Seven: Motor Starter and Relay Wiring Diagram.
Sheet Eight: Communication Network and Block Diagram.
Sheet Nine: DDC Panel Installation and Block Diagram.

(Repeat Sheets Four through Seven for each AHU System.)

b. The HVAC Control System Drawing Index shall show the name and number of the building, military site, State or other similar designation, and Country. The Drawing Index shall list HVAC Control System Drawings, including the drawing number, sheet number, drawing title, and computer filename when used. The HVAC Control System Legend shall show generic symbols and the name of devices shown on the HVAC Control System Drawings.

c. The valve schedule shall include each valve's unique identifier, size, flow coefficient Kv, pressure drop at specified flow rate, spring range, positive positioner range, actuator size, close-off pressure data, dimensions, and access and clearance requirements data. Valve schedules

may be submitted in advance but shall be included in the complete submittal.

d. The damper schedule shall contain each damper's and each actuator's identifier, nominal and actual sizes, orientation of axis and frame, direction of blade rotation, spring ranges, operation rate, positive positioner ranges, locations of actuators and damper end switches, arrangement of sections in multi-section dampers, and methods of connecting dampers, actuators, and linkages. The Damper Schedule shall include the maximum leakage rate at the operating static-pressure differential. The Damper Schedule shall contain actuator selection data supported by calculations of the torque required to move and seal the dampers, access and clearance requirements. Damper schedules may be submitted in advance but shall be included in the complete submittal.

e. Not Used.

f. The HVAC control system schematics shall be in the form shown, and shall show all control and mechanical devices associated with the HVAC system. A system schematic drawing shall be submitted for each HVAC system.

g. The HVAC control system equipment Schedule shall be in the form shown. All devices shown on the drawings having unique identifiers shall be referenced in the equipment schedule. Information to be included in the equipment schedule shall be the control loop, device unique identifier, device function, setpoint, input range, and additional important parameters (i.e., output range). An equipment schedule shall be submitted for each HVAC system.

h. The HVAC control system sequence of operation shall reflect the language and format of this specification, and shall refer to the devices by their unique identifiers as shown. No operational deviations from specified sequences will be permitted without prior written approval of the Contracting Officer. Sequences of operation shall be submitted for each HVAC control system including each type of terminal unit control system.

i. The HVAC control system wiring diagrams shall be functional wiring diagrams which show the interconnection of conductors and cables to HVAC control panel terminal blocks and to the identified terminals of devices, starters and package equipment. The wiring diagrams shall show necessary jumpers and ground connections. The wiring diagrams shall show the labels of all conductors. Sources of power required for HVAC control systems and for packaged equipment control systems shall be identified back to the panel board circuit breaker number, HVAC system control panel, magnetic starter, or packaged equipment control circuit. Each power supply and transformer not integral to a controller, starter, or packaged equipment shall be shown. The connected volt-ampere load and the power supply volt-ampere rating shall be shown. Wiring diagrams shall be submitted for each HVAC control system.

SD-07 Certificates

Performance Verification Test Procedures; G-D1.

Six copies of the HVAC Control System Performance Verification Test Procedures, in booklet form and indexed, 60 days before the Contractor's scheduled test dates. The performance verification test procedures shall refer to the devices by their unique identifiers as shown, shall explain, step-by-step, the actions and expected results that will demonstrate that the HVAC control system performs in accordance with the sequences of

operation, and other contract documents. An HVAC control system performance verification test equipment list shall be included that lists the equipment to be used during performance verification testing. The list shall include manufacturer name, model number, equipment function, the date of the latest calibration, and the results of the latest calibration.

SD-06 Test Reports

Performance Verification Test Report; G-D1.

copies of the HVAC Control System Performance Verification Test Report, in booklet form and indexed, within 30 days after completion of the test. The HVAC control system performance verification test report shall include data collected during the HVAC control system performance verification test. The original copies of all data gathered during the performance verification test shall be turned over to the Government after Government approval of the test results.

SD-11 Closeout Submittals

Service Organizations

Six copies of a list of service organizations qualified to service the HVAC control system. The list shall include the service organization name, address, technical point of contact and telephone number, and contractual point of contact and telephone number.

SD-10 Operation and Maintenance Data

Operation Manual; G-A.

Maintenance and Repair Manual; G-A

Six copies of the HVAC Control System Operation Manual , for each HVAC control system, 30 days before the date scheduled for the training course.

1.4 DELIVERY AND STORAGE

Products shall be stored with protection from the weather, humidity and temperature variations, dirt and dust, and other contaminants, within the storage condition limits published by the equipment manufacturer. Dampers shall be stored so that seal integrity, blade alignment and frame alignment are maintained.

1.5 OPERATION MANUAL

An HVAC control system operation manual in indexed booklet form shall be provided for each HVAC control system. The operation manual shall include the HVAC control system sequence of operation, and procedures for the HVAC system start-up, operation and shut-down. The operation manual shall include as-built HVAC control system detail drawings. The operation manual shall include the as-built configuration checksheets, the procedures for changing HVAC control system setpoints, and the procedures for placing HVAC system controllers in the manual control mode.

a. The procedures for changing HVAC control system setpoints shall describe the step-by-step procedures required to change the process variable setpoints, the alarm setpoints, the bias settings, and setpoint

reset schedules.

b. The procedures for placing HVAC system controllers in the manual control mode shall describe step-by-step procedures required to obtain manual control of each controlled device and to manually adjust their positions.

1.6 MAINTENANCE AND REPAIR MANUAL

An HVAC control system maintenance and repair manual in indexed booklet form in hardback binders shall be provided for each HVAC control system. The maintenance and repair manual shall include the routine maintenance checklist, a recommended repair methods list, a list of recommended maintenance and repair tools, the qualified service organization list, the as-built commissioning procedures and report, the as-built performance verification test procedures and report, and the as-built equipment data booklet.

a. The routine maintenance checklist shall be arranged in a columnar format. The first column shall list all devices listed in the equipment compliance booklet, the second column shall state the maintenance activity or state no maintenance required, the third column shall state the frequency of the maintenance activity, and the fourth column for additional comments or reference.

b. The recommended repair methods list shall be arranged in a columnar format and shall list all devices in the equipment data compliance booklet and state the guidance on recommended repair methods, either field repair, factory repair, or whole-item replacement.

c. The as-built equipment data booklet shall include the equipment compliance booklet and manufacturer supplied user manuals and information.

d. If the operation manual and the maintenance and repair manual are provided in a common volume, they shall be clearly differentiated and separately indexed.

1.7 MAINTENANCE AND SERVICE

Services, materials and equipment shall be provided as necessary to maintain the entire system in an operational state as specified for a period of one year after successful completion and acceptance of the Performance Verification Test. Impacts on facility operations shall be minimized.

1.7.1 Description of Work

The adjustment and repair of the system shall include the manufacturer's required adjustments of computer equipment, software updates, transmission equipment and instrumentation and control devices.

1.7.2 Personnel

Service personnel shall be qualified to accomplish work promptly and satisfactorily. The Government shall be advised in writing of the name of the designated service representative, and of any changes in personnel.

1.7.3 Scheduled Inspections

Two inspections shall be performed at six-month intervals (or less if required by the manufacturer), and all work required shall be performed. Inspections shall be scheduled in June and December . These inspections shall include:

- a. Visual checks and operational tests of equipment.
- b. Fan checks and filter changes for control system equipment.
- c. Clean control system equipment including interior and exterior surfaces.
- d. Check and calibrate each field device. Check and calibrate 50 percent of the total analog points during the first inspection. Check and calibrate the remaining 50 percent of the analog points during the second major inspection. Certify analog test instrumentation accuracy to be twice that of the device being calibrated. Randomly check at least 25 percent of all digital points for proper operation during the first inspection. Randomly check at least 25 percent of the remaining digital points during the second inspection.
- e. Run system software diagnostics and correct diagnosed problems.
- f. Resolve any previous outstanding problems.

1.7.4 Scheduled Work

This work shall be performed during regular working hours, Monday through Friday, excluding legal holidays.

1.7.5 Emergency Service

The Government will initiate service calls when the system is not functioning properly. Qualified personnel shall be available to provide service to the system. A telephone number where the service supervisor can be reached at all times shall be provided. Service personnel shall be at the site within 24 hours after receiving a request for service. The control system shall be restored to proper operating condition within three calendar days after receiving a request for service.

1.7.6 Operation

Scheduled adjustments and repairs shall include verification of the control system operation as demonstrated by the applicable tests of the performance verification test.

1.7.7 Records and Logs

Dated records and logs shall be kept of each task, with cumulative records for each major component, and for the complete system chronologically. A continuous log shall be maintained for all devices. The log shall contain initial analog span and zero calibration values and digital points. Complete logs shall be kept and shall be available for inspection onsite, demonstrating that planned and systematic adjustments and repairs have been accomplished for the control system.

1.7.8 Work Requests

Each service call request shall be recorded as received and shall include

the serial number identifying the component involved, its location, date and time the call was received, nature of trouble, names of the service personnel assigned to the task, instructions describing what has to be done, the amount and nature of the materials to be used, the time and date work started, and the time and date of completion. A record of the work performed shall be submitted within 5 days after work is accomplished.

1.7.9 System Modifications

Recommendations for system modification shall be submitted in writing. No system modifications, including operating parameters and control settings, shall be made without prior approval of the Government. Any modifications made to the system shall be incorporated into the operations and maintenance manuals, and other documentation affected.

PART 2 PRODUCTS

2.1 GENERAL EQUIPMENT REQUIREMENTS

Units of the same type of equipment shall be products of a single manufacturer. Each major component of equipment shall have the manufacturer's name and address, and the model and serial number in a conspicuous place. Materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacturing of such products, which are of a similar material, design and workmanship. The standard products shall have been in a satisfactory commercial or industrial use for two years prior to use on this project. The two years' use shall include applications of equipment and materials under similar circumstances and of similar size. The two years' experience shall be satisfactorily completed by a product which has been sold or is offered for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures. Products having less than a two-year field service record will be acceptable if a certified record of satisfactory field operation, for not less than 6,000 hours exclusive of the manufacturer's factory tests, can be shown. The equipment items shall be supported by a service organization. Items of the same type and purpose shall be identical, including equipment, assemblies, parts and components. Automatic temperature controls shall be direct digital controls that will provide the required sequence of operation.

2.1.1 Electrical and Electronic Devices

Electrical, and electronic devices not located within a DDC panel shall have a NEMA ICS 1 enclosure in accordance with NEMA 250 unless otherwise shown.

2.1.2 Standard Signals

Except for air distribution terminal unit control equipment, the output of all analog transmitters and the analog input and output of all DDC controllers shall be 4-to-20 mA_{dc} signals. The signal shall originate from current-sourcing devices and shall be received by current-sinking devices.

2.1.3 Ambient Temperature Limits

DDC panels shall have ambient condition ratings of 1.7 to 49 degrees C and 10 to 95 percent relative humidity, noncondensing. Devices installed outdoors shall operate within limit ratings of minus 37 to plus 66 degrees C. Instrumentation and control elements shall be rated for continuous

operation under the ambient environmental temperature, pressure, humidity, and vibration conditions specified or normally encountered for the installed location.

2.2 NOT USED

2.3 WIRING

2.3.1 Terminal Blocks

Terminal blocks shall be insulated, modular, feed-through, clamp style with recessed captive screw-type clamping mechanism, shall be suitable for rail mounting, and shall have end plates and partition plates for separation or shall have enclosed sides.

2.3.2 Control Wiring for 24-Volt Circuits

Control wiring for 24-volt circuits shall be 18 AWG minimum, stranded copper and shall be rated for 300-volt service.

2.3.3 Wiring for 120-Volt Circuits

Wiring for 120-volt circuits shall be 18 AWG minimum, stranded copper and shall be rated for 600-volt service.

2.3.4 Instrumentation Cable

Instrumentation cable shall be 18 AWG, stranded copper, single- or multiple-twisted, minimum 50 mm lay of twist, 100 percent shielded pairs, and shall have a 300-volt insulation. Each pair shall have a 20 AWG tinned-copper drain wire and individual overall pair insulation. Cables shall have an overall aluminum-polyester or tinned-copper cable-shield tape, overall 20 AWG tinned-copper cable drain wire, and overall cable insulation.

2.3.5 Transformers

Step down transformers shall be utilized where control equipment operates at lower than line circuit voltage. Transformers, other than transformers in bridge circuits, shall have primaries wound for the voltage available and secondaries wound for the correct control circuit voltage. Transformer shall be sized so that the connected load is 80 percent of the rated capacity or less. Transformers shall conform to UL 508 and NEMA ST 1.

2.4 ACTUATORS

Actuators shall be electric or electronic as shown and shall be provided with mounting and connecting hardware. The actuator stroke shall be limited in the direction of power stroke by an adjustable stop. Actuators shall have a visible position indicator. Actuators shall smoothly open or close the devices to which they are applied and shall have a full stroke response time of 60 seconds or less. Electric actuators shall have an oil-immersed gear train. Electric or electronic actuators operating in series shall have an auxiliary actuator driver. Electric or electronic actuators used in sequencing applications shall have an adjustable operating range and start point. Pneumatic actuators shall be rated for 172 kPa operating pressure except for high-pressure cylinder-type actuators.

2.5 NOT USED

2.6 DAMPERS

2.6.1 Damper Assembly

A single damper section shall have blades no longer than 1.2 meters and shall be no higher than 1.8 meters. Maximum damper blade width shall be 203 mm. Larger sizes shall be made from a combination of sections. Dampers shall be steel, or other materials where shown. Flat blades shall be made rigid by folding the edges. Blade-operating linkages shall be within the frame so that blade-connecting devices within the same damper section shall not be located directly in the air stream. Damper axles shall be 13 mm minimum, plated steel rods supported in the damper frame by stainless steel or bronze bearings. Blades mounted vertically shall be supported by thrust bearings. Pressure drop through dampers shall not exceed 10 Pa at 5.1 m/s in the wide-open position. Frames shall not be less than 50 mm in width. Dampers shall be tested in accordance with AMCA 500.

2.6.2 Operating Links

Operating links external to dampers, such as crankarms, connecting rods, and line shafting for transmitting motion from damper actuators to dampers, shall withstand a load equal to at least twice the maximum required damper-operating force. Rod lengths shall be adjustable. Links shall be brass, bronze, zinc-coated steel, or stainless steel. Working parts of joints and clevises shall be brass, bronze, or stainless steel. Adjustments of crankarms shall control the open and closed positions of dampers.

2.6.3 Damper Types

Dampers shall be parallel-blade type.

2.6.3.1 Outside Air, Return Air, and Relief Air Dampers

Outside air, return air and relief air dampers shall be provided where shown. Blades shall have interlocking edges and shall be provided with compressible seals at points of contact. The channel frames of the dampers shall be provided with jamb seals to minimize air leakage. Dampers shall not leak in excess of 102 L/s per square meter at 1017 Pa static pressure when closed. Seals shall be suitable for an operating temperature range of minus 40 to plus 94 degrees C. Dampers shall be rated at not less than 10 m/s air velocity.

2.6.3.2 Mechanical and Electrical Space Ventilation Dampers

Mechanical and electrical space ventilation dampers shall be as shown. Dampers shall not leak in excess of 406 L/s per square meter at 1017 Pa static pressure when closed. Dampers shall be rated at not less than 7.6 m/s air velocity.

2.7 SMOKE DETECTORS

Duct smoke detectors shall be provided in supply and return air ducts in accordance with NFPA 90A. Duct smoke detectors shall conform to the requirements of UL 268A. Duct smoke detectors shall have perforated sampling tubes extended into the air duct. Detector circuitry shall be

mounted in a metallic enclosure exterior to the duct. Detectors shall have manual reset. Detectors shall be rated for air velocities that include air flows between 2.5 and 20 m/s. Detectors shall be powered from the fire alarm control panel (FACP). Detectors shall have two sets of normally open alarm contacts and two sets of normally closed alarm contacts. Detectors shall be connected to the building fire alarm panel for alarm initiation. A remote annunciation lamp and accessible remote reset switch shall be provided for duct detectors that are mounted eight feet or more above the finished floor and for detectors that are not readily visible. Remote lamps and switches as well as the affected fan units shall be properly identified in etched rigid plastic placards.

2.8 INSTRUMENTATION

2.8.1 Measurements

Transmitters shall be calibrated to provide the following measurements, over the indicated ranges, for an output of 4 to 20 mAdc:

- a. Conditioned space temperature, from 10 to 30 degrees C .
- b. Duct temperature, from 5 to 60 degrees C .
- h. Outside-air temperature, from minus 35 to plus 55 degrees C .

2.8.2 Temperature Instruments

2.8.2.1 Resistance Temperature Detectors (RTD)

Temperature sensors shall be 100 ohms 3- or 4-wire RTD. Each RTD shall be platinum with a tolerance of plus or minus 0.1 percent at 0 degrees C , and shall be encapsulated in epoxy, series 300 stainless steel, anodized aluminum, or copper. Each RTD shall be furnished with an RTD transmitter as specified, integrally mounted unless otherwise shown.

2.8.2.2 Continuous Averaging RTD

Continuous averaging RTDs shall have a tolerance of plus or minus 0.5 degrees C at the reference temperature, and shall be of sufficient length to ensure that the resistance represents an average over the cross section in which it is installed. The sensing element shall have a bendable copper sheath. Each averaging RTD shall be furnished with an RTD transmitter to match the resistance range of the averaging RTD.

2.8.2.3 RTD Transmitter

The RTD transmitter shall match the resistance range of the RTD. The transmitter shall be a two-wire, loop powered device. The transmitter shall produce a linear 4-to-20 mAdc output corresponding to the required temperature measurement. The output error shall not exceed 0.1 percent of the calibrated measurement.

2.8.3 Not Used

2.8.4 Not Used

2.8.5 Not Used

2.8.6 Differential Pressure Instruments

The instrument shall be a pressure transmitter with an integral sensing

element. The instrument over pressure rating shall be 300 percent of the operating pressure. The sensor/transmitter assembly accuracy shall be plus or minus two percent of full scale. The transmitter shall be a two-wire, loop-powered device. The transmitter shall produce a linear 4-to-20 mA_{dc} output corresponding to the required pressure measurement.

2.8.7 Thermowells

Thermowells shall be Series 300 stainless steel with threaded brass plug and chain, 50 mm lagging neck and extension type well. Inside diameter and insertion length shall be as required for the application.

2.8.8 Sunshields

Sunshields for outside air temperature sensing elements shall prevent the sun from directly striking the temperature sensing elements. The sunshields shall be provided with adequate ventilation so that the sensing element responds to the ambient temperature of the surroundings. The top of each sunshield shall have a galvanized metal rainshield projecting over the face of the sunshield. The sunshields shall be painted white.

2.9 THERMOSTATS

Thermostat ranges shall be selected so that the setpoint is adjustable without tools between plus or minus 5 degrees C of the setpoint shown. Thermostats shall be electronic or electric.

2.9.1 Nonmodulating Room Thermostats

Contacts shall be single-pole double-throw (SPDT), hermetically sealed, and wired to identified terminals. Maximum differential shall be 3 degrees C. Room thermostats shall be enclosed with separate locking covers (guards).

2.9.2 Microprocessor Based Room Thermostats

Microprocessor based thermostats shall have built-in keypads for scheduling of day and night temperature settings. Access to the scheduling mode shall be by a password control code. When out of the scheduling mode, thermostats shall have continuous display of time, with AM and PM indicator, continuous display of day of week, and either continuous display of room temperature with display of temperature setpoint on demand, or continuous display of temperature setpoint with display of room temperature on demand. In the programmable mode, the display shall be used for interrogating time program ON-OFF setpoints for all seven days of the week. The time program shall allow two separate temperature setback intervals per day. The thermostats shall have a means for temporary and manual override of the program schedule, with automatic program restoration on the following day. Thermostats shall have a replaceable battery to maintain the timing and maintain the schedule in memory for one year in the event of a power outage. Maximum differential shall be 1 degree C. When used for heat pump applications, the thermostat shall have an emergency heat switch.

2.9.3 Modulating Room Thermostats

Modulating room thermostats shall have either one output signal, two output signals operating in unison, or two output signals operating in sequence, as required for the application. Each thermostat shall have an adjustable throttling range of 2 to 4 degrees C for each output. Room thermostats shall be enclosed with separate locking covers (guards).

2.9.4 Nonmodulating Capillary Thermostats and Aquastats

Each thermostat shall have a capillary length of at least 1500 mm , shall have adjustable direct-reading scales for both setpoint and differential, and shall have a differential adjustable from 3 to 9 degrees C. Aquastats shall be of the strap on type, with 5 degrees C fixed differential.

2.9.5 Freezestats

Freezestats shall be manual reset, low temperature safety thermostats, with NO and NC contacts and a 6000 mm element which shall respond to the coldest 450 mm segment.

2.9.6 Modulating Capillary Thermostats

Each thermostat shall have either one output signal, two output signals operating in unison, or two output signals operating in sequence, as required for the application. Thermostats shall have adjustable throttling ranges of 2 to 4 degrees C for each output.

2.9.7 [Enter Appropriate Subpart Title Here] 2.9.7.1 [Enter Appropriate Subpart Title Here]

2.10 PRESSURE SWITCHES AND SOLENOID VALVES

2.10.1 Pressure Switches

Each switch shall have an adjustable setpoint with visible setpoint scale. Range shall be as shown. Differential adjustment shall span 20 to 40 percent of the range of the device.

2.10.2 Differential-Pressure Switches

Each switch shall be an adjustable diaphragm-operated device with two SPDT contacts, with taps for sensing lines to be connected to duct pressure fittings designed to sense air pressure. These fittings shall be of the angled-tip type with tips pointing into the air stream. The setpoint shall not be in the upper or lower quarters of the range and the range shall not be more than three times the setpoint. Differential shall be a maximum of 35 Pa at the low end of the range and 85 Pa at the high end of the range.

2.11 INDICATING DEVICES

2.11.1 Thermometers

2.11.1.1 Piping System Thermometers

Piping system thermometers shall have brass, malleable iron or aluminum alloy case and frame, clear protective face, permanently stabilized glass tube with indicating-fluid column, white face, black numbers, and a 230 mm scale. Thermometers for piping systems shall have rigid stems with straight, angular, or inclined pattern.

2.11.1.2 Piping System Thermometer Stems

Thermometer stems shall have expansion heads as required to prevent breakage at extreme temperatures. On rigid-stem thermometers, the space between bulb and stem shall be filled with a heat-transfer medium.

2.11.1.3 Nonaveraging Air-Duct Thermometers

Air-duct thermometers shall have perforated stem guards and 45-degree adjustable duct flanges with locking mechanism.

2.11.1.4 Averaging Air-Duct Thermometers

Averaging thermometers shall have a 90 mm (nominal) dial, with black legend on white background, and pointer traveling through a 270-degree arc.

2.11.1.5 Accuracy

Thermometers shall have an accuracy of plus or minus one percent of scale range. Thermometers shall have a range suitable for the application.

2.11.2 Pressure Gauges

Gauges shall be 50 mm (nominal) size, back connected, suitable for field or panel mounting as required, shall have black legend on white background, and shall have a pointer traveling through a 270-degree arc. Accuracy shall be plus or minus three percent of scale range. Gauges shall meet requirements of ASME B40.1.

2.12 CONTROL DEVICES AND ACCESSORIES

2.12.1 Relays

Control relay contacts shall have utilization category and ratings selected for the application, with a minimum of two sets of contacts (two normally open, two normally closed) enclosed in a dustproof enclosure. Relays shall be rated for a minimum life of one million operations. Operating time shall be 20 milliseconds or less. Relays shall be equipped with coil transient suppression devices to limit transients to 150 percent of rated coil voltage. Time delay relays shall be 2PDT with eight-pin connectors, dust cover, and a matching rail-mounted socket. Adjustable timing range shall be 0 to 5 minutes. Power consumption shall not be greater than three watts.

2.12.2 Not Used

2.12.3 Joule or Watthour Meters

Joule meters shall be in accordance with ANSI C12.1 and have pulse initiators for remote monitoring of Joule consumption. Pulse initiator shall consist of form C contacts with a current rating not to exceed two amperes and voltage not to exceed 500 V, with combinations of VA not to exceed 100 VA, and a life rating of one billion operations. Meter sockets shall be in accordance with ANSI C12.1.

2.12.4 Joule or Watthour Meters with Demand Register

Meters shall be in accordance with ANSI C12.1 and shall have pulse initiators for remote monitoring of Joule consumption and instantaneous demand. Pulse initiators shall consist of form C contacts with a current rating not to exceed two amperes and voltage not to exceed 500 V, with combinations of VA not to exceed 100 VA, and a life rating of one billion operations. Meter sockets shall be in accordance with ANSI C12.1

2.12.5 Joule or Watthour Transducers

Joule transducers shall have an accuracy of plus or minus 0.25 percent for kW and Joule outputs from full lag to full lead power factor. Input ranges for kW and Joule transducers shall be selectable without requiring the changing of current or potential transformers. The output shall be 4 to 20 mAdc.

2.12.6 Current Sensing Relays

Current sensing relays shall provide a normally-open contact rated at a minimum of 50 volts peak and 1/2 ampere or 25 VA, noninductive. There shall be a single hole for passage of current carrying conductors. The devices shall be sized for operation at 50 percent rated current based on the connected load. Voltage isolation shall be a minimum of 600 volts.

2.12.7 Power-Line Conditioners (PLC)

Power line conditioners shall be furnished for each DDC panel. The PLCs shall provide both voltage regulation and noise rejection. The PLCs shall be of the ferro-resonant design, with no moving parts and no tap switching, while electrically isolating the secondary from the power-line side. The PLCs shall be sized for 125 percent of the actual connected kVA load. Characteristics of the PLC shall be as follows:

a. At 85 percent load, the output voltage shall not deviate by more than plus or minus one percent of nominal when the input voltage fluctuates between minus 20 percent to plus 10 percent of nominal.

b. During load changes of zero to full load, the output voltage shall not deviate by more than plus or minus three percent of nominal voltage. Full correction of load switching disturbances shall be accomplished within five cycles, and 95 percent correction shall be accomplished within two cycles of the onset of the disturbance.

c. Total harmonic distortion shall not exceed 3-1/2 percent at full load.

2.13 NOT USED

2.13.1 [Enter Appropriate Subpart Title Here] 2.13.1.1 [Enter Appropriate Subpart Title Here]

2.14 DIRECT DIGITAL CONTROL (DDC) HARDWARE

All functions, constraints, data base parameters, operator developed programs and any other data shall be downloadable from a portable workstation/tester to RTU's. Download shall be accomplished through both the primary network and the local DDC portable workstation/tester port.

DDC/EMCS DDC Panels and DTC Panels

DDC PANEL (REMOTE TERMINAL UNIT)

DDC panels shall be provided by HSQ Technologies Inc. and shall be Model 25xx/86, including associated interface boards, expansion boards, photo switches, circuit breakers, convenience outlets, power supplies and pulse to analog (PTA) converters. Any RTU not on UPS power shall have full battery backup. The battery shall have sufficient power to last for six hours. Each DDC panel shall be defined as including all specified DDC panel characteristics, including I/O functions as specified. All RAM based programs shall be downline loadable from the CCU, building controller or portable tester.

a. DDC panels shall be microcomputer-based with a minimum word size of eight bits. Each DDC panel shall have a minimum of 10 percent of its I/O functions as spare capacity. The type of spares shall be in the same proportion as the implemented I/O functions on the DDC panel, but in no case shall there be less than two spare points of each implemented I/O type. The DDC panel I/O functions shall be furnished complete, with no changes or additions necessary to support implementation of spare functions. Output relays associated with digital signals shall be considered part of the I/O function, whether physically mounted in the enclosure or separately mounted. Implementation of spare points by others shall necessitate only providing the additional field sensor or control, field wiring including connection to the system, and point definition assignment by the operator. The DDC panel shall contain all necessary I/O functions to connect to field sensors and control panels.

b. The DDC panel shall include: (deviations may be submitted for approval to the Contracting Officer)

(1) The following controls:

- (a) Main power switch.
- (b) On-off line switch - enables and disables communications with CCU/CCC and /or building controller.
- (c) Self test switch - exercise DDC panel functions.
- (d) Reset switch - initializes CPU operation.
- (e) DDC panel outputs disable switch.

(2). The following indicators:

- (a) Power on - includes one for each power supply voltage.
- (b) On Line (remotely-controlled).
- (c) GO-NO GO for self test of DDC panel and all communications functions.
- (d) DDC panel outputs disabled.

c. Sufficient memory shall be provided to perform all specified and shown DDC panel functions and operations, including all spares, but not less than 64K bytes.

d. DDC Panel Communications. DDC panel to CCU Communications: Communications interfaces shall be provided for specified DTM circuit between DDC panels and the CCU and/or the building controller.

e. The DDC panel shall contain hardware to support a power fail automatic restart as specified.

DATA TERMINAL CABINET (DTC)

The DTC shall serve as an interface between each DDC panel, and the DE instrumentation and controls. No instrumentation or control devices shall be located within the DTC.

a. The DTC shall be an independent metallic enclosure not physically part of the DDC panel. The DTC shall be sized to accommodate the number of I/O functions required for each DDC panel, including installed spares, plus 25 percent expansion for each type of I/O function provided.

b. The DTC shall be provided with double sided screw type terminal strips. One side of the terminal strip shall be used for termination of field

wiring from instrumentation and controls. The other side shall be used to connect the DTC to the DDC panel. Terminal strips shall have individual terminal identification numbers.

c. The DTC shall be a locking type mounting enclosure, with common keying and door switch wired to a DDC panel input for intrusion alarm annunciation in the MCR. DTC keying shall be identical to the DDC panel.

SUPPORT EQUIPMENT

ENCLOSURES

Shall conform to the requirements of NEMA 250 for the types specified. Finish color shall be the manufacturer's standard, unless otherwise indicated. Damaged surfaces shall be repaired and refinished using original type finish. Enclosures installed indoors shall be NEMA 12 or as shown. Enclosures installed outdoors shall be NEMA 4 unless otherwise shown. Enclosures for DDC panels and DTC's installed outdoors shall contain a thermostatically controlled space heater to maintain the enclosure above the dew point.

POWER SUPPLY

The DDC panels shall have power conditioning hardware.

DDC PANEL SOFTWARE

a. Monitoring and Control - Each command shall be executed by the DDC panel only after all constraints checks have been passed. Each command point shall have unique constraints assigned. High and low reasonableness values or one differential rate-of-change value shall be assigned to each analog input. Values outside the reasonableness limits shall be rejected.

c. DDC Panel Self-Test Diagnostics - Each DDC panel shall have self-test diagnostic routines implemented in firmware. The tests shall include routines that exercise memory.

d. DDC Panel Resident Applications Programs - The Contractor shall provide the following applications programs as specified in paragraph APPLICATIONS PROGRAMS and as required by the I/O summary tables, and the associated constraints and interlocks as specified and shown, resident in the panel.

e. Software Control Blocks - The Contractor shall provide a hard copy of the software control blocks on media compatible with the DDC panel portable tester as specified herein.

DDC PANEL COMMAND SOFTWARE

a. Calculated Point - This value shall be created by calculating it from any combination of digital and analog points, or other data. The result of the calculation will be an analog or digital point having all the properties of real points, including alarms, without the associated hardware. The calculated analog point shall have point identification in the same format as any other analog point. The calculated point shall be used in any program where the real value is not obtainable directly. Calculated point values shall be current for use by the system within 10 seconds of the time any input value changes.

b. Analog Totalization - Any analog point shall be operator assignable to the totalization program. Analog values shall be totalized within a given time period. This time period shall be defined uniquely for each point for intervals of 1 minute over an 8-hour period, 1 hour over a 1-week period, 1 week over a 1-month period, and 1 month over a 1-year period. At the end of the period, store the totals for future reference. Totalization shall then restart from zero for the next time period. The program shall keep track of the peak and total value measured during the current period and for the previous period. The operator shall be able to initiate a summary of all totalization information on a point, unit, building, or entire system. The operator shall be able to set or reset each totalized value individually. The operator shall be able to define, modify, or delete the time period on-line.

DDC PANEL APPLICATIONS PROGRAMS

a. Program Inputs - The Contractor shall select the appropriate program inputs listed for each application program to calculate the required program outputs. Where the specific program inputs are not available, such as no status indication called for on the I/O summary table, provide a default value to replace the missing input, thus allowing the application program to be tested. All analog inputs to applications programs shall have an operator adjustable deadband to preclude short cycling or hunting.

b. PID Tuning Program - Software shall be provided to generate a time based plot of the PID control action. The plotted variables shall be the process variable and the control output, which shall be displayed and updated in real time as the control parameters are changed. The major tuning parameters for the PID control loop shall be displayed on the plot.

c. Control Applications - Software shall be provided to allow the operator to generate control logic programs in free form which shall include the following basic capabilities:

- (1) If, else, then statement logic.
- (2) Do-loops.
- (3) Algebraic calculations.
- (4) Boolean logic statements.
- (5) Relational expressions.

2.14.1 Not Used
2.14.2 NOT USED
2.14.3 Not Used)
2.14.4 Not Used
2.14.5 Not Used
2.14.6 Not Used

2.14.7 I/O Functions

2.14.7.1 DDC Hardware I/O Functions

I/O Functions shall be provided as part of the DDC system and shall be in accordance with the following:

a. The analog input (AI) function shall monitor each analog input, perform A-to-D conversion, and hold the digital value in a buffer for interrogation. The A-to-D conversion shall have a minimum resolution of 10 bits plus sign. Signal conditioning shall be provided for each analog input. Analog inputs shall be individually calibrated for zero and span,

in hardware or in software. The AI shall incorporate common mode noise rejection of 50 dB from 0 to 100 Hz for differential inputs, and normal mode noise rejection of 20 dB at 60 Hz from a source impedance of 10,000 ohms. Input ranges shall be within the range of 4-to-20 mAdc.

b. The analog output (AO) function shall accept digital data, perform D-to-A conversion, and output a signal within the range of 4-to-20 mAdc. D-to-A conversion shall have a minimum resolution of eight bits plus sign. Analog outputs shall be individually calibrated for zero and span. Short circuit protection on voltage outputs and open circuit protection on current outputs shall be provided. An individual gradual switch for manual override of each analog output and means of physically securing access to these switches shall be provided. Each AO shall have a three-position switch for selection of the DDC control signal, no control, or a locally generated control signal for connection to the controlled device. Feedback shall be provided to the system as to the status of the output (manual control or automatic). Switches for pneumatic control outputs shall provide a connection for an externally generated pneumatic signal. All switches shall be either of a key operated design with the same keying system used for other outputs or otherwise suitably protected from unauthorized access .

c. The digital input (DI) function shall accept on-off, open-close, or other change of state (two state data) indications. Isolation and protection against an applied steady-state voltage up to 180 Vac peak shall be provided.

d. The digital output (DO) function shall provide contact closures for momentary and maintained operation of output devices. Closures shall have a minimum duration of 0.1 second. DO relays shall have an initial breakdown voltage between contacts and coil of at least 500 V peak. Electromagnetic interference suppression shall be furnished on all output lines to limit transients to nondamaging levels. Protection against an applied steady-state voltage up to 180 Vac peak shall be provided. Minimum contact rating shall be one ampere at 24 Vac. Key locked HOA switches shall be provided for manual override of each digital output. Feedback shall be provided to the system as to the status of the output (manual control or automatic). Switches shall be common keyed .

e. The pulse accumulator function shall have the same characteristics as the DI. In addition, a buffer shall be provided to totalize pulses and allow for interrogation by the DDC system. The pulse accumulator shall accept rates up to 20 pulses per second. The totalized value shall be reset to zero upon operator's command.

f. Signal conditioning for sensors shall be provided as specified.

g. The binary coded decimal (BCD) function: The BCD function shall have the same characteristics as the DI, except that, in addition, a buffer shall be provided to totalize inputs and allow for interrogation by the network control panel. The BCD function shall have 16-channel optically isolated buffered inputs to read four digit numbers. The BCD function shall accumulate inputs at rates up to 10 inputs per second.

2.14.7.2 Failure Mode

Upon failure of the I/O function, including data transmission failure, logic power supply failure, DDC processor malfunction, software failure, interposing relay power failure, or any other failure which prevents stand

alone operation of any DDC normally capable of stand alone operation, connected outputs shall be forced to the failure mode shown.

2.14.8 Portable Workstation/Tester

A portable workstation/tester shall be provided and shall be able to connect to any DDC hardware. The portable workstation/tester shall consist of a portable computer with a nominal 10 inch active color matrix liquid crystal display, capable of displaying up to 256 colors at a minimum resolution of 640 X 480 pixels, an external VGA monitor port, 32 bit microprocessor operating at a minimum of 100 MHZ. The portable workstation/tester shall have, as a minimum, a 1200 MB hard drive, 16 megabytes of memory, integral pointing device, serial and parallel ports, color VGA video port for an external color monitor, 3.5 inch floppy disk drive, modem, PCMCIA type 3 slot, rechargeable battery, battery charger and 120 Vac power supply. It shall include carrying case, extra battery, charger and a compatible network adapter. The workstation/tester shall:

- a. Run DDC diagnostics.
- b. Load all DDC memory resident programs and information, including parameters and constraints.
- c. Display any AI, DI, AO, DO, or PA point in engineering units for analog points or status for digital points.
- d. Control any AO or DO.
- e. Provide an operator interface, contingent on password level, allowing the operator to use full English language words and acronyms, or an object oriented graphical user interface.
- f. Display database parameters.
- g. Modify database parameters.
- h. Accept DDC software and information for subsequent loading into a specific DDC. Provide all necessary software and hardware required to support this function, including an EIA ANSI/EIA/TIA 232-E port.
- i. Disable/enable each DDC.
- j. Perform all workstation functions as specified.

2.15 DDC SOFTWARE

All DDC software described in this specification shall be furnished as part of the complete DDC System.

2.15.1 Operating System

Each DDC shall contain an operating system that controls and schedules that DDC's activities in real time. The DDC shall maintain a point database in its memory that includes all parameters, constraints, and the latest value or status of all points connected to that DDC. The execution of DDC application programs shall utilize the data in memory resident files. The operating system shall include a real time clock function that maintains the seconds, minutes, hours, date and month, including day of the week. Each DDC real time clock shall be automatically synchronized with the

network control panel real time clock at least once per day to plus or minus 10 seconds. When the network control panel is connected to a central workstation/tester, the network control panel RTC shall be updated by the central workstation/tester RTC. The time synchronization shall be accomplished without operator intervention and without requiring system shutdown. The operating system shall allow loading of software, data files data entry, and diagnostics from the central workstation/tester both locally through the central workstation/tester port and remotely through a network control panel and the manufacturers control network.

2.15.1.1 Startup

The DDC shall have startup software that causes automatic commencement of operation without human intervention, including startup of all connected I/O functions. A DDC restart program based on detection of power failure at the DDC shall be included in the DDC software. Upon restoration of power to the DDC, the program shall restart equipment and restore loads to the state at time of power failure, or to the state as commanded by time programs or other overriding programs. The restart program shall include start time delays between successive commands to prevent demand surges or overload trips. The startup software shall initiate operation of self-test diagnostic routines. Upon failure of the DDC, if the database and application software are no longer resident or if the clock cannot be read, the DDC shall not restart and systems shall remain in the failure mode indicated until the necessary repairs are made. If the database and application programs are resident, the DDC shall resume operation after an adjustable time delay of from 0 to 600 seconds. The startup sequence for each DDC shall include a unique time delay setting for each control output when system operation is initiated.

2.15.1.2 Operating Mode

Each DDC shall control and monitor functions as specified, independent of communications with other DDC. This software shall perform all DDC functions and DDC resident application programs as specified using data obtained from I/O functions and based upon the DDC real time clock function. When communications circuits between the DDC are operable, the DDC shall obtain real time clock updates and any required global data values transmitted from other network control panels. The DDC software shall execute commands after performing constraints checks in the DDC. Status and analog values, including alarms and other data shall be transmitted from other network control panels when communications circuits are operable. If communications are not available, each DDC shall function in stand-alone mode and operational data, including the latest status and value of each point and results of calculations, normally transmitted from other network control panels shall be stored for later transmission to the network control panel. Storage for the latest 256 values shall be provided at each network control panel. Each DDC shall accept software downloaded from the network control panel. Constraints shall reside at the DDC.

2.15.1.3 Failure Mode

Upon failure for any reason, each DDC shall perform an orderly shutdown and force all DDC outputs to a predetermined (failure mode) state, consistent with the failure modes shown and the associated control device.

2.15.2 Functions

The Contractor shall provide software necessary to accomplish the following

functions, as appropriate, fully implemented and operational, within each network control panel, RIU, unitary controller and universal programmable controller.

- a. Scanning of inputs.
- b. Control of outputs.
- c. Reporting of analog changes outside a selectable differential.
- d. Reporting of unauthorized digital status.
- e. Reporting of alarms automatically to network control panel.
- f. Reporting of I/O status to network control panel upon request.
- g. Maintenance of real time, updated by the network control panel at least once a day.
- h. Communication with the network control panel.
- i. Execution of DDC resident application programs.
- j. Averaging or filtering of AIs.
- k. Constraints checks (prior to command issuance).
- l. Diagnostics.
- m. Portable workstation/tester operation as specified.
- n. Reset of PA by operator based on time and value.

2.15.2.1 Analog Monitoring

The system shall measure and transmit analog values including calculated analog points. An analog change in value is defined as a change exceeding a preset differential value as specified. The record transmitted for each analog value shall include a readily identifiable flag which indicates the abnormal status of the value when it deviates from operator selectable upper and lower analog limits. Analog values shall be expressed in proper engineering units with sign. Engineering units conversions shall be provided for each measurement. Each engineering units conversion set shall include range, span, and conversion equation. A vocabulary of engineering unit descriptors shall be provided, using at least three alphanumeric characters to identify information in the system. The system shall support 255 different engineering units.

2.15.2.2 Logic (Virtual) Points

Logic (virtual) points shall be software points entered in the point database which are not directly associated with a physical I/O function. Logic (virtual) points shall be analog or digital points created by calculation from any combination of digital and analog points, or other data having the properties of real points, including alarms, without the associated hardware. Logic (virtual) points shall be defined or calculated and entered into the database by the Contractor. The calculated analog point shall have point identification in the same format as any other analog point. The calculated point shall be used in any program where the

real value is not obtainable directly. Constants used in calculations shall be changeable on-line by the operator. Calculated point values shall be current for use by the system within 10 seconds of the time of any input changes.

2.15.2.3 State Variables

If an analog point represents more than two (up to eight) specific states, each state shall be nameable. For example, a level sensor shall be displayed at its measured engineering units plus a state variable with named states usable in programs or for display such as low alarm/low/normal/high/high alarm.

2.15.2.4 Analog Totalization

Any analog point shall be operator assignable to the totalization program. Up to eight analog values shall be totalized within a selectable time period. At the end of the period, the totals shall be stored. Totalization shall then restart from zero for the next time period. The program shall keep track of the peak and total value measured during the current period and for the previous period. The operator shall be able to set or reset each totalized value individually. The time period shall be able to be operator defined, modified or deleted on-line.

2.15.2.5 Energy Totalization

The system shall calculate the heat energy in Btus, for each energy source consumed by the mechanical systems specified, totalize the calculated Btus, the instantaneous rate in Btus per hour, and store totals in thousands of Btus (MBtu). The Btus calculated shall be totalized for an adjustable time period. The time period shall be defined uniquely for each Btu totalization.

2.15.2.6 Trending

Any analog or calculated point shall be operator assignable to the trend program. Up to eight points shall be sampled at individually assigned intervals, selectable between one minute and two hours. A minimum of the most recent 128 samples of each trended point shall be stored. The sample intervals shall be able to be defined, modified, or deleted on-line.

2.15.3 I/O Point Database/Parameter Definition

Each I/O point shall be defined in a database residing in the DDC. The definition shall include all physical parameters associated with each point. Each point shall be defined and entered into the database by the Contractor, including as applicable:

- a. Name.
- b. Device or sensor type (i.e., sensor, control relay, motors).
- c. Point identification number.
- d. Unit.
- e. Building number.
- f. Area.

- g. Island.
- h. DDC number and channel address.
- i. KW (running).
- j. KW (starting).
- k. Sensor range.
- l. Controller range.
- m. Sensor span.
- n. Controller span.
- o. Engineering units conversion (scale factor).
- p. Setpoint (analog).
- q. High reasonableness value (analog).
- r. Low reasonableness value (analog).
- s. High alarm limit differential (return to normal).
- t. Low alarm limit differential (return to normal).
- u. High alarm limit (analog).
- v. Low alarm limit (analog).
- w. Alarm disable time period upon startup or change of setpoint.
- x. Analog change differential (for reporting).
- y. Alarm class and associated primary message text.
- z. High accumulator limit (pulse).
- aa. Status description.
- bb. Run time target.
- cc. Failure mode as specified and shown.
- dd. Constraints as specified.

2.15.4 Alarm Processing

Each DDC shall have alarm processing software for AI, DI, and PA alarms for all real and virtual points connected to that DDC.

2.15.4.1 Digital Alarms Definition

Digital alarms are those abnormal conditions indicated by DIs as specified and shown.

2.15.4.2 Analog Alarms Definition

Analog alarms are those conditions higher or lower than a defined value, as measured by an AI. Analog readings shall be compared to predefined high and low limits, and alarmed each time a value enters or returns from a limit condition. Unique high and low limits shall be assigned to each analog point in the system. Analog alarm limits shall be stored in the DDC database. Each analog alarm limit shall have an associated unique limit differential specifying the amount by which a variable must return into the proper operating range before being annunciated as a return-to-normal-state. All limits and differentials shall be entered on-line by the operator in limits of the measured variable, without interruption or loss of monitoring of the point concerned. The program shall automatically change the high or low limits or both, of any analog point, based on time scheduled operations as specified, allowing for a time interval before the alarm limit becomes effective. In CPA applications, key the limit to a finite deviation traveling with the setpoint. The system shall automatically suppress analog alarm reporting associated with a digital point when that digital point is turned off.

2.15.4.3 Pulse Accumulator Alarms Definition

Pulse accumulator alarms are those conditions calculated from totalized values of accumulator inputs or PA input rates that are outside defined limits as specified and shown. PA totalized values shall be compared to predefined limits and alarmed each time a value enters a limit condition. Unique limits shall be assigned to each PA point in the system. Limits shall be stored in the DDC database.

2.15.5 Constraints

2.15.5.1 Equipment Constraints Definitions

Each control point in the database shall have DDC resident constraints defined and entered by the Contractor, including as applicable:

- a. Maximum starts (cycles) per hour.
- b. Minimum off time.
- c. Minimum on time.
- d. High limit (value in engineering units).
- e. Low limit (value in engineering units).

2.15.5.2 Constraints Checks

Control devices connected to the system shall have the DDC memory resident constraints checked before each command is issued to insure that no equipment damage will result from improper operation. Each command shall be executed by the DDC only after all constraints checks have been passed. Each command point shall have unique constraints assigned. High and low "reasonableness" values or one differential "rate-of-change" value shall be assigned to each AI. Values outside the reasonableness limits shall be rejected and an alarm message sent to the network control panel or portable workstation/tester. Status changes and analog point values shall be reported to the workstation upon operator request, such as for reports, alphanumeric displays, graphic displays, and application programs. Each

individual point shall be capable of being selectively disabled by the operator from a workstation/tester. Disabling a point shall prohibit monitoring and automatic control of that point.

2.15.6 Diagnostics

Each DDC shall have self-test diagnostic routines implemented in firmware. The tests shall include routines that exercise memory. Diagnostic software shall be usable in conjunction with the central workstation/tester and portable workstation/tester. The software shall display messages in English to inform the tester's operator of diagnosed problems.

2.15.7 Summer-Winter Operation Monitoring

The system shall provide software to automatically change the operating parameters, monitoring of alarm limits, and start-stop schedules for each mechanical system from summer to winter and vice-versa. The software shall provide automatic commands to applications programs to coordinate proper summer or winter operation. Change over setpoints shall be operator selectable and settable.

2.15.8 Control Sequences and Control Loops

Sufficient memory shall be provided to implement the requirements specified and shown for each DDC. Specific functions to be implemented are defined in individual system control sequences and database tables shown in the drawings, and shall include, as applicable, the following:

a. PI Control: This function shall provide proportional control and proportional plus integral control.

b. Two Position Control: This function shall provide control for a two state device by comparing a set point against a process variable and an established deadband.

c. Floating Point Control: This function shall exercise control when an error signal exceeds a selected deadband, and shall maintain control until the error is within the deadband limits.

d. Signal Selection: This function shall allow the selection of the highest or lowest analog value from a group of analog values as the basis of control. The function shall include the ability to cascade analog values so that large numbers of inputs can be reduced to one or two outputs.

e. Signal Averaging: This function shall allow the mathematical calculation of the average analog value from a group of analog values as the basis of control. The function shall include the ability to "weight" the individual analog values so that the function output can be biased as necessary to achieve proper control.

f. Reset Function: This function shall develop an AO based on up to two AIs and one operator specified reset schedule.

g. Cooling/Heating Operation Program: Software shall be provided to change, either automatically or on operator command, the operating parameters, monitoring of alarm limits, and start-stop schedules for each mechanical system where such a change from cooling to heating and vice versa is meaningful. The software shall provide commands to application programs to coordinate cooling or heating mode operation. Software shall

automatically switch facilities from cooling to heating, and vice versa, based on schedules or temperatures. All HVAC equipment and systems shall be assigned to the program.

2.15.9 Command Priorities

A scheme of priority levels shall be provided to prevent interaction of a command of low priority with a command of higher priority. The system shall require the latest highest priority command addressed to a single point to be stored for a period of time longer than the longest time constraint in the on and off states, insuring that the correct command shall be issued when the time constraint is no longer in effect or report the rejected command. Override commands entered by the operator shall have higher priority than those emanating from applications programs.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION CRITERIA

3.1.1 HVAC Control System

The HVAC control system shall be completely installed and ready for operation. Dielectric isolation shall be provided where dissimilar metals are used for connection and support. Penetrations through and mounting holes in the building exterior shall be made watertight. The HVAC control system installation shall provide clearance for control system maintenance by maintaining access space between coils, access space to mixed-air plenums, and other access space required to calibrate, remove, repair, or replace control system devices. The control system installation shall not interfere with the clearance requirements for mechanical and electrical system maintenance.

3.1.2 Software Installation

Software shall be loaded for an operational system, including databases for all points, operational parameters, and system, command, and application software. The Contractor shall provide original and backup copies of source, excluding the general purpose operating systems and utility programs furnished by computer manufacturers and the non-job-specific proprietary code furnished by the system manufacturer, and object modules for software on each type of media utilized, within 30 days of formal Government acceptance. In addition, a copy of individual floppy disks of software for each DDC panel shall be provided.

3.1.3 Device Mounting Criteria

Devices mounted in or on piping or ductwork, on building surfaces, in mechanical/electrical spaces, or in occupied space ceilings shall be installed in accordance with manufacturer's recommendations and as shown. Control devices to be installed in piping and ductwork shall be provided with required gaskets, flanges, thermal compounds, insulation, piping, fittings, and manual valves for shutoff, equalization, purging, and calibration. Strap-on temperature sensing elements shall not be used except as specified.

3.1.4 Wiring Criteria

Wiring external to control panels, including low-voltage wiring, shall be installed in metallic raceways. Nonmetallic-sheathed cables or

metallic-armored cables may be installed in areas permitted by NFPA 70 Wiring shall be installed without splices between control devices and DDC panels. Instrumentation grounding shall be installed as necessary to prevent ground loops, noise, and surges from adversely affecting operation of the system. Ground rods installed by the contractor shall be tested as specified in IEEE Std 142. Cables and conductor wires shall be tagged at both ends, with the identifier shown on the shop drawings. Electrical work shall be as specified in Section 16415 ELECTRICAL WORK, INTERIOR and as shown.

3.2 CONTROL SYSTEM INSTALLATION

3.2.1 Damper Actuators

Actuators shall not be mounted in the air stream. Multiple actuators operating a common damper shall be connected to a common drive shaft. Actuators shall be installed so that their action shall seal the damper to the extent required to maintain leakage at or below the specified rate and shall move the blades smoothly.

3.2.2 Not Used

3.2.3 Room Instrument Mounting

Room instruments shall be mounted so that their sensing elements are 1.5 m above the finished floor unless otherwise shown. Temperature setpoint device shall be recess mounted.

3.2.4 Freezestats

For each 2 square meters of coil face area, or fraction thereof, a freezestat shall be provided to sense the temperature at the location shown. Manual reset freezestats shall be installed in approved, accessible locations where they can be reset easily. The freezestat sensing element shall be installed in a serpentine pattern.

3.2.5 Averaging Temperature Sensing Elements

Sensing elements shall have a total element minimum length equal to 3 m per square meter of duct cross-sectional area.

3.3 CONTROL SEQUENCES OF OPERATION

3.3.1 General Requirements - HVAC Systems

These requirements shall apply to all primary HVAC systems unless modified herein. The sequences describe the actions of the control system for one direction of change in the HVAC process analog variable, such as temperature, humidity or pressure. The reverse sequence shall occur when the direction of change is reversed.

3.3.1.1 Supply Fan Operating

HVAC system outside air, return air, and relief air dampers shall function as described for specific modes of operation Interlocked exhaust fans shall be stopped in the unoccupied and ventilation delay modes and their dampers shall be closed. Interlocked exhaust fans shall run in the occupied mode, and their dampers shall open. Cooling coil control valves and cooling coil circulating pumps shall function as described for the specific modes of

operation Heating coil valves shall be under control.

3.3.1.2 Supply Fan Not Operating

When an HVAC system is stopped, all interlocked fans shall stop, the outside air and relief air dampers shall close, the return air damper shall open, all stages of direct-expansion cooling shall stop, the system shall pump down if it has a pump down cycle, humidification shall stop, and cooling coil valves for coils located indoors shall close to the coil. Cooling coil valves of units located outdoors shall open to the coil. Heating coil valves shall remain under control.

3.3.2 Not Used

3.3.3 Unit Heater and Cabinet Unit Heater

All Modes - A wall-mounted thermostat with an "AUTO-OFF" switch located as shown, shall cycle the fan to maintain its setpoint as shown when the switch is in the "AUTO" position. When the switch is in the "OFF" position, the fan shall be stopped.

3.3.4 Gas-Fired Infrared Heater

A microprocessor-based room thermostat with "AUTO-OFF" switch, located as shown, shall control the infrared heater. Auto Mode - When the switch is in the "AUTO" position, the thermostat shall cycle the infrared heater to maintain the day and night setpoints. Programmed occupied times shall be considered "day" and programmed unoccupied times shall be considered "night." Off Mode - When the switch is in the "OFF" position, the infrared heater shall be off.

3.3.5 All-Air Small Package Unitary System

A microprocessor-based room thermostat, located as shown, with "HEAT-OFF-COOL" and "AUTO-ON" switches shall control the system. Heating Mode - Cooling unit shall be off, and heating shall be active. The thermostat shall operate the condensing unit and system fan to maintain the day and night setpoints as shown. Programmed occupied times shall be considered "day" and programmed unoccupied times shall be considered "night." Cooling Mode - Heating unit shall be off. During the day the thermostat shall operate the condensing units and system fan to maintain the setpoint. The condensing unit shall be off at night. Off Mode - The system shall be off. On Mode - The system fan shall run continuously. Auto Mode - The system fan shall operate whenever heating or cooling is required.

3.4 COMMISSIONING PROCEDURES

3.4.1 Evaluations

The Contractor shall make the observations, adjustments, calibrations, measurements, and tests of the control systems, set the time schedule, and make any necessary control system corrections to ensure that the systems function as described in the sequence of operation.

3.4.1.1 Item Check

Signal levels shall be recorded for the extreme positions of each controlled device. An item-by-item check of the sequence of operation

requirements shall be performed using Steps 1 through 4 in the specified control system commissioning procedures. Steps 1, 2, and 3 shall be performed with the HVAC system shut down; Step 4 shall be performed after the HVAC systems have been started. External input signals to the DDC system (such as starter auxiliary contacts, and external systems) may be simulated in steps 1, 2, and 3. With each operational mode signal change, DDC system output relay contacts shall be observed to ensure that they function.

3.4.1.2 Weather Dependent Test Procedures

Weather dependent test procedures that cannot be performed by simulation shall be performed in the appropriate climatic season. When simulation is used, the actual results shall be verified in the appropriate season.

3.4.1.3 Two-Point Accuracy Check

A two-point accuracy check of the calibration of each HVAC control system sensing element and transmitter shall be performed by comparing the DDC system readout to the actual value of the variable measured at the sensing element and transmitter or airflow measurement station location. Digital indicating test instruments shall be used, such as digital thermometers, motor-driven psychrometers, and tachometers. The test instruments shall be at least twice as accurate as the specified sensing element-to-DDC system readout accuracy. The calibration of the test instruments shall be traceable to National Institute Of Standards And Technology standards. The first check point shall be with the HVAC system in the shutdown condition, and the second check point shall be with the HVAC system in an operational condition. Calibration checks shall verify that the sensing element-to-DDC system readout accuracies at two points are within the specified product accuracy tolerances. If not, the device shall be recalibrated or replaced and the calibration check repeated.

3.4.1.4 Insertion and Immersion Temperatures

Insertion temperature and immersion temperature sensing elements and transmitter-to-DDC system readout calibration accuracy shall be checked at one physical location along the axis of the sensing element.

3.4.1.5 Averaging Temperature

Averaging temperature sensing element and transmitter-to-DDC system readout calibration accuracy shall be checked every 600 mm along the axis of the sensing element in the proximity of the sensing element, for a maximum of 10 readings. These readings shall then be averaged.

3.4.2 Not Used

3.4.3 Unit Heater and Cabinet Unit Heater

The "OFF/AUTO" switch shall be placed in the "OFF" position. Each space thermostat temperature setting shall be turned up so that it makes contact to turn on the unit heater fans. The unit heater fans shall not start. The "OFF/AUTO" switch shall be placed in the "AUTO" position. It shall be ensured that the unit heater fans start. Each space thermostat temperature setting shall be turned down, and the unit heater fans shall stop. The thermostats shall be set at their temperature setpoints. The results of testing of one of each type of unit shall be logged.

- 3.4.4 Not Used
- 3.4.5 Not Used
- 3.4.6 Not Used
- 3.4.7 Not Used

3.4.8 Single Building Hydronic Heating with Hot Water Boiler

Steps for installation shall be as follows:

a. Step 1 - System Inspection: The HVAC system shall be observed in its shutdown condition. It shall be verified that power and main air are available where required.

b. Step 2 - Calibration Accuracy Check with HVAC System Shutdown: Readings shall be taken with a digital thermometer at each temperature sensing element location. Each temperature shall be read at the DDC controller, and the thermometer and DDC system readings logged. The calibration accuracy of the sensing element-to-DDC system readout for outside air temperature and system supply temperature shall be checked.

c. Step 3 - Actuator Range Adjustments: A signal shall be applied to the actuator through an operator entered value to the DDC system. The proper operation of the actuators and positioners for all valves shall be verified visually. The signal shall be varied from live zero to full range, and it shall be verified that the actuators travel from zero stroke to full stroke within the signal range. It shall be verified that all sequenced actuators move from zero stroke to full stroke in the proper direction, and move the connected device in the proper direction from one extreme position to the other.

d. Step 4 - Control System Commissioning:

(1) The two-point calibration sensing element-to-DDC system readout accuracy check for the outside air temperature shall be performed. Any necessary software adjustments to setpoints or parameters shall be made to achieve the outside air temperature schedule.

(2) The outside air temperature shall be simulated through an operator entered value to be above the setpoint. It shall be verified that pumps [_____] and boiler [_____] stop. A value shall be entered to simulate that the outside air temperature is below the setpoint as shown. It shall be verified that pumps [_____] start and boiler [_____] operates.

(3) The two-point calibration accuracy check of the sensing element-to-DDC system readout for the hydronic system supply temperature shall be performed. The supply temperature setpoint shall be set for the temperature schedule as shown. Signals of 8 ma and 16 ma shall be sent to the DDC system from the outside air temperature sensor, to verify that the supply temperature setpoint changes to the appropriate values.

(4) The control system shall be placed in the occupied mode. The calibration accuracy check of sensing element-to-DDC system readout shall be performed for each space temperature sensor and the values logged. Each space temperature setpoint shall be set as shown. The control system shall be placed in the unoccupied mode, and it shall be verified that each space temperature

setpoint changes to the unoccupied mode setting.

3.4.9 Central Plant High Temperature Hot Water Hydronic Heating

Steps for installation shall be as follows:

a. Step 1 - System Inspection: The HVAC system shall be observed in its shutdown condition. It shall be verified that power and main air are available where required and that the converter valve is closed.

b. Step 2 - Calibration Accuracy Check with HVAC System Shutdown: Readings shall be taken with a digital thermometer at each temperature sensing element location. Each temperature shall be read at the DDC controller, and the thermometer and DDC system readings logged. The calibration accuracy of the sensing element-to-DDC system readout for outside air temperature and system supply temperature shall be checked.

c. Step 3 - Actuator Range Adjustments: A signal shall be applied to the actuator through an operator entered value to the DDC system. The proper operation of the actuators and positioners for all valves shall be verified. The signal shall be varied from live zero to full range, and it shall be verified that the actuators travel from zero stroke to full stroke within the signal range. It shall be verified that all sequenced actuators move from zero stroke to full stroke in the proper direction, and move the connected device in the proper direction from one extreme position to the other.

d. Step 4 - Control System Commissioning:

(1) The two-point calibration sensing element-to-DDC system readout accuracy check for the outside air temperature shall be performed. Any necessary software adjustments shall be made to setpoints or parameters to achieve the outside air temperature schedule.

(2) The outside air temperature shall be simulated through an operator entered value to be above the setpoint. It shall be verified that pump [_____] stops and the high-temperature hot-water control valve closes. A value shall be entered to simulate that the outside air temperature is below the setpoint as shown. It shall be verified that pump [_____] starts.

(3) The two-point calibration accuracy check of the sensing element-to-DDC system readout for the hydronic system supply temperature shall be performed. The supply temperature setpoint shall be set for the temperature schedule as shown. Signals of 8 ma and 16 ma shall be sent to the DDC system from the outside air temperature sensor, to verify that the supply temperature setpoint changes to the appropriate values. A high temperature condition shall be initiated in the hydronic system supply line by lowering the thermostat setting. It shall be verified that the high-temperature hot water shutoff valve closes and an alarm is initiated. The thermostat shall be set at the setting shown, the safety circuit shall be manually reset, and it shall be verified that the shutoff valve opens and a return-to-normal signal is sent.

(4) The control system shall be placed in the occupied mode. The calibration accuracy check of sensing element-to-DDC system readout shall be performed for each space temperature sensor and

the values logged. Each space temperature setpoint shall be set as shown. The control system shall be placed in the unoccupied mode, and it shall be verified that each space temperature setpoint changes to the unoccupied mode setting.

- 3.4.10 Not Used
- 3.4.11 Not Used
- 3.4.12 Not Used
- 3.4.13 Not Used
- 3.4.14 Not Used
- 3.4.15 Not Used
- 3.4.16 Not Used

3.4.17 Variable Air Volume Control System - Without Return Fan

Steps for installation shall be as follows:

a. Step 1 - System Inspection: The HVAC system shall be observed in its shutdown condition. The system shall be checked to see that power and main air are available where required, the outside air and relief air dampers are closed, the return air damper is open, and the supply fan inlet vanes and cooling coil valve are closed.

b. Step 2 - Calibration Accuracy Check with HVAC System in Shutdown: Readings shall be taken with a digital thermometer at each temperature sensing element location. Each temperature shall be read at the DDC controller, and the thermometer and DDC system display readings logged. The calibration accuracy of the sensing element-to-DDC system readout for outside air, return air, mixed air, and the cooling coil discharge temperatures shall be checked. The minimum outside air flow shall be read, using a digital indicating velometer, and the velometer and DDC system display readings logged. The flow should read zero.

c. Step 3 - Actuator Range Adjustments: A signal shall be applied to the actuators through an operator entered value to the DDC system. The proper operation of the actuators and positioners for all dampers and valves shall be visually verified. The signal shall be varied from live zero to full range, and it shall be verified that the actuators travel from zero stroke to full stroke within the signal range. It shall be verified that all sequenced and parallel operated actuators move from zero stroke to full stroke in the proper direction, and move the connected device in the proper direction from one extreme position to the other.

d. Step 4 - Control System Commissioning:

(1) With the fan ready to start, the control system shall be placed in the ventilation delay mode and in the occupied mode through operator entered values. It shall be verified that supply fan [_____] starts. It shall be verified that the outside air dampers and relief damper are closed, the return air damper is open, and the cooling coil valve and inlet vanes are under control, by simulating a change in the fan discharge temperature. The system shall be placed out of the ventilation delay mode, and it shall be verified that the economizer outside air and relief air dampers remain closed, the return air damper remains open, and the minimum outside air damper comes under control.

(2) The two-point calibration accuracy check of sensing element-to-DDC system readout for the minimum outside air flow

measurement station shall be performed. Force all VAV box dampers to the full open position, turn all exhaust fans off, manually adjust the supply duct static pressure to achieve the design duct static pressure, and manually adjust the minimum outside air flow to achieve a flow which is approximately 25% less than the desired air flow. Under these conditions, the minimum outside air flow control loop shall be tuned. Confirm stable operation of the minimum outside air flow control loop in response to a process disturbance.

(3) With supply fan [_____] running, a high static pressure input signal shall be simulated at the device, by pressure input to the differential pressure switch sensing device. HVAC system shutdown shall be verified; it shall be verified that the high static pressure alarm is initiated. The differential pressure switch shall be set at the setpoint. The HVAC system shall be restarted by manual reset, and it shall be verified that the high static pressure alarm returns to normal.

(4) The two-point calibration accuracy check for sensing element-to-DDC system readout for the static pressure in the supply duct shall be performed.

(5) The economizer mode shall be simulated by a change in the outside air temperature and the return air temperature through operator entered values and it shall be verified that the system goes into the economizer mode. The mixed air temperature shall be artificially changed through operator entered values to slightly open the economizer outside air damper and the second point of the two-point calibration accuracy check of sensing element-to-DDC system readout for outside air, return air, and mixed air temperatures shall be performed. The temperature setpoint shall be set as shown.

(6) The two-point calibration accuracy check of sensing element-to-DDC system readout for the fan discharge temperature shall be performed. The setpoint for the fan discharge temperature shall be set as shown. A change shall be simulated in the discharge air temperature through an operator entered value and it shall be verified that the control valve is modulated.

(7) The control system shall be placed in the unoccupied mode and it shall be verified that the HVAC system shuts down and the control system assumes the specified shutdown conditions. The space temperature shall be artificially changed to below the night setback temperature setpoint, and it shall be verified that the HVAC system starts; the space temperature shall be artificially changed to above the night setback setpoint, and it shall be verified that the HVAC system stops. The night setback temperature setpoint shall be set at the setpoint shown.

(8) With the HVAC system running, a filter differential pressure switch input signal shall be simulated at the device. It shall be verified that the filter alarm is initiated. The differential pressure switch shall be set at the setpoint. This shall be performed for each filter.

(9) With the HVAC system running, a freezestat trip input signal shall be simulated at the device. HVAC system shutdown shall be

verified. It shall be verified that a low temperature alarm is initiated. The freeze stat shall be set at the setpoint. The HVAC system shall be restarted by manual restart and it shall be verified that the alarm returns to normal.

(10) With the HVAC system running, a smoke detector trip input signal shall be simulated at each detector, and control device actions and interlock functions as described in the Sequence of Operation shall be verified. Simulation shall be performed without false-alarms any Life Safety systems. It shall be verified that the HVAC system shuts down and the smoke detector alarm is initiated. The detectors shall be reset. The HVAC system shall be restarted by manual reset, and it shall be verified that the alarm returns to normal.

(11) Velocity setpoints shall be set for minimum and maximum flow and temperature setpoints for the heating/cooling dead band, for each VAV terminal unit. The actions of the controller, the operation of the damper, and the operation of heating shall be verified. It shall be verified that space temperature is maintained.

3.4.18 Variable Air Volume Control System - With Return Fan

Steps for installation shall be as follows:

a. Step 1 - System Inspection: The HVAC system shall be observed in its shutdown condition. It shall be verified that power and main air are available where required, and that the outside air and relief air dampers are closed, the return air damper is open, and that the supply fan and return/relief fan inlet vanes and cooling coil valve are closed.

b. Step 2 - Calibration Accuracy Check with HVAC System Shutdown: Readings shall be taken with a digital thermometer at each temperature sensing element location. Each temperature shall be read at the DDC controller, and the thermometer and DDC system display readings logged. The calibration accuracy of the sensing element-to-DDC system readout for outside air, return air, mixed air, and cooling coil discharge temperatures shall be checked. The minimum outside air flow, supply air flow, and return air flow shall be read, using a digital indicating velometer, and the velometer and DDC system display readings logged. The flows should read zero.

c. Step 3 - Actuator Range Adjustments: A signal shall be applied to the actuators through an operator entered value at the DDC system. The proper operation of the actuators and positioners for all dampers and valves shall be visually verified. The signal shall be varied from live zero to full range, and actuator travel shall be verified from zero stroke to full stroke within the signal range. It shall be verified that all sequenced and parallel operated actuators move from zero stroke to full stroke in the proper direction, and move the connected device in the proper direction from one extreme position to the other.

d. Step 4 - Control System Commissioning:

(1) With the fans ready to start, the control system shall be placed in the ventilation delay mode and in the occupied mode, and it shall be verified that supply fan [_____] and return fan [_____] start. It shall be verified that the outside air dampers

and relief air damper are closed, the return air damper is open, and the cooling coil valve and inlet vanes are under control, by simulating a change in the fan discharge temperature. The system shall be placed out of the ventilation delay mode, and it shall be verified that the economizer outside air and relief air dampers remain closed, the return air damper remains open, and the minimum outside air damper comes under control.

(2) The two-point calibration accuracy check of sensing element-to-DDC system readout for the minimum outside air flow measurement station shall be performed. Force all VAV box dampers to the full open position, turn all exhaust fans off, manually adjust the supply duct static pressure to achieve the design duct static pressure, manually adjust the output to the return fan to establish the design differential flow difference between the supply and return duct flows, and manually adjust the minimum outside air flow to achieve a flow which is approximately 25% less than the desired air flow. Under these conditions, the minimum outside air flow control loop shall be tuned. Confirm stable operation of the minimum outside air flow control loop in response to a process disturbance.

(3) The starter switch of return fan [_____] shall be turned to the "OFF" position, and the inlet vane damper shall be opened. With supply fan [_____] running, a high static pressure input signal shall be simulated at the device by a pressure input to the sensing device. HVAC system shutdown shall be observed, and it shall be verified that the high static alarm is initiated. The HVAC system shall be restarted by manual reset, and it shall be verified that the high static alarm returns to normal.

(4) The two-point accuracy check of sensing element-to-DDC system readout for the static pressure in the supply duct shall be performed.

(5) Each VAV terminal unit controller's minimum flow and maximum flow setpoints shall be set at the same setting. This will prevent the VAV box damper from modulating under space temperature control and will achieve a constant supply duct system pressure drop. The return fan inlet vane shall be placed under control, and the starter switch shall be turned to the "AUTO" position so that the fan starts. The two-point calibration accuracy check of sensing element-to-DDC system readout for the air flow measurement stations shall be performed. The supply fan inlet vane shall be operated manually to change the supply fan flow, and the control system shall be set to control at [_____] cfm at 4-ma input and [_____] cfm at 20-ma input. The supply fan flow shall be changed to verify that the return flow setpoint tracks the supply fan flow with the proper flow differential.

(6) The economizer mode shall be simulated by a change in the outside air temperature and the return air temperature through operator entered values and it shall be verified that the system goes into the economizer mode. The mixed air temperature shall be artificially changed through operator entered values to slightly open the economizer outside air damper and the second point of the two-point calibration accuracy check of sensing element-to-DDC system readout for outside air, return air, and mixed air temperatures shall be performed. The temperature setpoint shall

be set as shown.

(7) The two-point calibration accuracy check of sensing element-to-DDC system readout for the fan discharge temperature shall be performed. The setpoint for the fan discharge temperature shall be set as shown. A change shall be simulated in the discharge air temperature through an operator entered value and it shall be verified that the control valve is modulated.

(8) The control system shall be placed in the unoccupied mode and it shall be verified that the HVAC system shuts down and the control system assumes the specified shutdown conditions. The space temperature shall be artificially changed to below the night setback temperature setpoint, and it shall be verified that the HVAC system starts; the space temperature shall be artificially changed to above the night setback temperature setpoint and it shall be verified that the HVAC system stops. The night setback temperature setpoint shall be set at the setpoint.

(9) With the HVAC system running, a filter differential pressure switch input signal shall be simulated at the device. It shall be verified that the filter alarm is initiated. The differential pressure switch shall be set at the setpoint as shown. This shall be performed for each filter.

(10) With the HVAC system running, a freezestat trip input signal shall be simulated at the device. HVAC system shutdown shall be verified. It shall be verified that a low temperature alarm is initiated. The freezestat shall be set at the setpoint as shown. The HVAC system shall be restarted by manual restart and it shall be verified that the alarm returns to normal.

(11) With the HVAC system running, a smoke detector trip input signal shall be simulated at each device. Control device actions and interlock functions as described in the Sequence of Operation shall be verified. Simulation shall be performed without false-alarming any Life Safety systems. It shall be verified that the HVAC system shuts down and the smoke detector alarm is initiated. The detectors shall be reset. The HVAC system shall be restarted by manual reset, and the alarm return-to-normal shall be verified.

(12) For each VAV terminal unit, velocity setpoints shall be set for minimum and maximum flow, and temperature setpoints for the heating/cooling dead band. The actions of the controller, the operation of the damper, and the operation of heating shall be verified. It shall be verified that space temperature is maintained.

3.4.19 Single Zone with Hydronic Heating and Cooling Coils; No Return Fan

Steps for installation shall be as follows:

a. Step 1 - System Inspection: The HVAC system shall be verified in its shutdown condition. The system shall be checked to see that power and main air are available where required, that the outside air damper, relief air damper, and cooling coil valve are closed, and that the return air damper is open.

b. Step 2 - Calibration Accuracy Check with HVAC System Shutdown: Readings shall be taken with a digital thermometer at each temperature sensing element location. Each temperature shall be read at the DDC controller, and the thermometer and DDC system display readings logged. The calibration accuracy of the sensing element-to-DDC system readout for outside air, return air, and space temperatures shall be checked.

c. Step 3 - Actuator Range Adjustments: A signal shall be applied to the actuator through an operator entered value to the DDC system. The proper operation of the actuators and positioners for all dampers and valves shall be visually verified. The signal shall be varied from live zero to full range, and the actuator travel from zero stroke to full stroke within the signal range shall be verified. It shall be verified that all sequenced and parallel-operated actuators move from zero stroke to full stroke in the proper direction, and move the connected device in the proper direction from one extreme position to the other.

d. Step 4 - Control System Commissioning:

(1) With the fan ready to start, the control system shall be placed in the ventilation delay mode and in the occupied mode, and it shall be verified that supply fan [_____] starts. It shall be verified that the outside air and relief air dampers are closed, the return air damper is open, and the heating coil and cooling coil valves are under control, by simulating a change in the space temperature through an operator entered value. The control system shall be placed out of the ventilation delay mode, and it shall be verified that the outside air, return air, and relief air dampers come under control by simulating a change in the space temperature.

(2) The control system shall be placed in the minimum outside air mode. It shall be verified that the outside air damper opens to minimum position.

(3) The economizer mode shall be simulated by a change in the outside air temperature and the return air temperature through operator entered values and it shall be verified that the system goes into the economizer mode. The space temperature shall be artificially changed through operator entered values to slightly open the outside air damper and the second point of the two-point calibration accuracy check of sensing element-to-DDC system readout for outside air, return air, and space temperatures shall be performed. The space temperature setpoint shall be set as shown.

(4) An unoccupied mode signal shall be applied, and it shall be verified that the HVAC system shuts down, and the control system assumes the specified shutdown conditions. The space temperature shall be artificially changed to below the night setback temperature setpoint, and it shall be verified that the HVAC system starts; the space temperature shall be set to above the night setback setpoint, and it shall be verified that the HVAC system stops. The night setback temperature setpoint shall be set at the setpoint as shown.

(5) With the HVAC system running, a filter differential pressure switch input signal shall be simulated at the device. It shall be verified that the filter alarm is initiated. The differential pressure switch shall be set at the setpoint.

(6) With the HVAC system running, a freezestat trip input signal shall be simulated at the device. HVAC system shutdown shall be verified. It shall be verified that a low temperature alarm is initiated. The freezestat shall be set at the setpoint. The HVAC system shall be restarted by manual restart and it shall be verified that the alarm returns to normal.

(7) With the HVAC system running, a smoke detector trip input signal at each detector shall be simulated, and control device actions and interlock functions as described in the Sequence of Operation shall be verified. Simulation shall be performed without false-alarming any Life Safety systems. It shall be verified that the HVAC system shuts down and that the smoke detector alarm is initiated. The detectors shall be reset. The HVAC system shall be restarted by manual reset, and it shall be verified that the alarm returns to normal.

3.4.20 Single Zone with Dual Temperature Coil; No Return Fan

Steps for installation shall be as follows:

a. Step 1 - System Inspection: The HVAC system shall be verified in its shutdown condition. The system shall be checked to see that power and main air are available where required, the outside air damper, relief air damper, and cooling coil valve are closed, and that the return air damper is open.

b. Step 2 - Calibration Accuracy Check with HVAC System Shutdown: Readings shall be taken with a digital thermometer at each temperature sensing element location. Each temperature shall be read at the DDC controller, and the thermometer and DDC system display readings logged. The calibration accuracy of the sensing element-to-DDC system readout shall be checked for outside air, return air, and space temperatures.

c. Step 3 - Actuator Range Adjustments: A signal shall be applied to the actuator through an operator entered value to the DDC system. The proper operation of the actuators and positioners for all dampers and valves shall be visually verified. The signal shall be varied from live zero to full range, and it shall be verified that the actuators travel from zero stroke to full stroke within the signal range. It shall be verified that all sequenced and parallel operated actuators move from zero stroke to full stroke in the proper direction and move the connected device in the proper direction from one extreme position to the other.

d. Step 4 - Control System Commissioning:

(1) With the fan ready to start, the control system shall be placed in the ventilation delay mode and in the occupied mode, and it shall be verified that supply fan [_____] starts. It shall be verified that the outside air and relief air dampers are closed, the return air damper is open, and the dual-temperature coil control valve is under control, by simulating a change in the space temperature. The control system shall be placed out of the ventilation delay mode, and it shall be verified that the outside air, return air, and relief air dampers come under control by simulating a change in the controller output.

(2) The control system shall be placed in the minimum outside air

mode. It shall be verified that the outside air damper opens to minimum position.

(3) The economizer mode shall be simulated by a change in the outside air temperature and the return air temperature through operator entered values and it shall be verified that the system goes into the economizer mode. The space temperature shall be artificially changed through operator entered values to slightly open the outside air damper and the second point of the two-point calibration accuracy check of sensing element-to-DDC system readout for outside air, return air, and space temperatures shall be performed. The space temperature setpoint shall be set as shown.

(4) Dual-temperature hydronic changeover operation of aquastat shall be simulated. Control system selection of opposite season space temperature control shall be verified by artificially changing the dual-temperature hydronic temperature.

(5) The control system shall be placed in the unoccupied mode, and it shall be verified that the HVAC system shuts down, and the control system assumes the specified shutdown conditions. The space temperature shall be artificially changed to below the night setback temperature setpoint, and it shall be verified that the HVAC system starts; the space temperature shall be artificially changed to above the night setback temperature setpoint and it shall be verified that the HVAC system stops. The night setback temperature setpoint shall be set at the setting as shown.

(6) With the HVAC system running, a filter differential pressure switch input signal shall be simulated at the device. It shall be verified that the filter alarm is initiated. The differential pressure switch shall be set at the setpoint.

(7) With the HVAC system running, a freezestat trip input signal shall be simulated at the device. HVAC system shutdown shall be verified. It shall be verified that a low temperature alarm is initiated. The freezestat shall be set at the setpoint. The HVAC system shall be restarted by manual restart and it shall be verified that the alarm returns to normal.

(8) With the HVAC system running, a smoke detector trip input signal shall be simulated at each detector, and control device actions and interlock functions as described in the Sequence of Operation shall be verified. Simulation shall be performed without false-alarms any Life Safety systems. It shall be verified that the HVAC system shuts down and that the smoke detector alarm is initiated. The detectors shall be reset. The HVAC system shall be restarted by manual reset, and it shall be verified that the alarm returns to normal.

3.4.21 Single Zone with Humidification; No Return Fan

Steps for installation shall be as follows:

a. Step 1 - System Inspection: The HVAC system shall be verified in its shutdown condition. The system shall be checked to see that power and main air are available where required, and that the outside air damper, humidifier valve and cooling coil valve are closed.

b. Step 2 - Calibration Accuracy Check with HVAC System Shutdown: Readings shall be taken with a digital thermometer at each temperature sensing elements location. Each temperature shall be read at the DDC controller, and the thermometer and DDC system display readings logged. The calibration accuracy of the sensing element-to-DDC system readout for outside air, return air, mixed air, and cooling coil discharge temperatures shall be checked. A motor-driven psychrometer shall be used to check the wet-bulb and dry-bulb temperatures of the humidifier discharge air and of the air in the space, and the psychrometer, and DDC system display readings shall be read and logged.

c. Step 3 - Actuator Range Adjustments: A signal shall be applied to the actuator, through an operator entered value to the DDC system. The proper operation of the actuators and positioners for all dampers and valves shall be visually verified. The signal shall be varied from live zero to full range, and the actuators travel shall be verified from zero stroke to full stroke within the signal range. It shall be verified that all sequenced and parallel operated actuators move from zero stroke to full stroke in the proper direction, and move the connected device in the proper direction from one extreme position to the other.

d. Step 4 - Control System Commissioning:

(1) With the fan ready to start, the control system shall be placed in the ventilation delay mode and in the occupied mode, and it shall be verified that supply fan [_____] starts. It shall be verified that the outside air damper is closed, and the heating coil, cooling coil, and humidifier valves are under control, by simulating a change in the space humidity and the space temperature. The system shall be placed out of the ventilation delay mode, and it shall be verified that the outside air damper opens.

(2) The two-point calibration accuracy check of sensing element-to-DDC system readout for the preheat coil discharge air temperature shall be performed. The setpoint for the coil discharge air temperature shall be set as shown. A change shall be simulated in the coil discharge air temperature through an operator entered value and it shall be verified that the preheat coil control valve is modulated.

(3) The calibration accuracy check for sensing element-to-DDC system readout for the space temperature shall be performed. The space temperature setpoint shall be set as shown. A change shall be simulated in the space temperature and it shall be verified that the heating coil valve and cooling coil valve are under control.

(4) The calibration accuracy check for sensing element-to-DDC system readout for the space relative humidity shall be performed. An identical calibration accuracy check for the duct relative humidity shall be performed. The space relative humidity and the duct relative humidity setpoints shall be set as shown. A change shall be simulated in the space relative humidity or in the duct relative humidity and it shall be verified that the humidifier valve and cooling coil valve are under control.

(5) The hydronic heating temperature controller "MANUAL/AUTO"

station shall be indexed to the "MANUAL" position. The controller output shall be changed to open the converter valve slightly. The 2-point calibration accuracy check for sensing element-to-DDC system readout for the space temperature shall be performed. The temperature setpoint shall be set as shown.

(6) The control system shall be placed in the unoccupied mode and it shall be verified that the HVAC system shuts down, and the control system assumes the specified shutdown conditions. The space temperature shall be artificially changed to below the night setback temperature setpoint and it shall be verified that the HVAC system starts; the space temperature shall be artificially changed to above the night setback temperature setpoint, and it shall be verified that the HVAC system stops. The night setback temperature setpoint shall be set at the setpoint as shown.

(7) With the HVAC system running, a filter differential pressure switch input signal shall be simulated at the device. It shall be verified that the filter alarm is initiated. The differential pressure switch shall be set at the setpoint.

(8) With the HVAC system running, a freezestat trip input signal shall be simulated at the device. HVAC system shutdown shall be verified. It shall be verified that a low temperature alarm is initiated. The freezestat shall be set at the setpoint. The HVAC system shall be restarted by manual restart and it shall be verified that the alarm returns to normal.

(9) With the HVAC system running, a smoke detector trip input signal shall be simulated at each detector, and control device actions and interlock functions as described in the Sequence of Operation shall be verified. Simulation shall be performed without false-alarming any Life Safety systems. It shall be verified that the HVAC system shuts down and that the smoke detector alarm is initiated. The detectors shall be reset. The HVAC system shall be restarted by manual reset, and it shall be verified that the alarm returns to normal.

3.5 BALANCING, COMMISSIONING, AND TESTING

3.5.1 Coordination with HVAC System Balancing

Commissioning of the control system, except for tuning of controllers, shall be performed prior to or simultaneous with HVAC system balancing. The contractor shall tune the HVAC control system after all air system and hydronic system balancing has been completed, minimum damper positions set and a report has been issued.

3.5.2 Control System Calibration, Adjustments, and Commissioning

Control system commissioning shall be performed for each HVAC system, using test plans and procedures previously approved by the Government. The Contractor shall provide all personnel, equipment, instrumentation, and supplies necessary to perform commissioning and testing of the HVAC control system. All instrumentation and controls shall be calibrated and the specified accuracy shall be verified using test equipment with calibration traceable to NIST standards. Wiring shall be tested for continuity and for ground, open, and short circuits. Tubing systems shall be tested for leaks. Mechanical control devices shall be adjusted to operate as

specified. HVAC control panels shall be pretested off-site as a functioning assembly ready for field connections, calibration, adjustment, and commissioning of the operational HVAC control system. Control parameters and logic (virtual) points including control loop setpoints, gain constants, and integral constraints, shall be adjusted before the system is placed on line. Communications requirements shall be as indicated. Written notification of any planned commissioning or testing of the HVAC Control systems shall be given to the Government at least 14 calendar days in advance.

3.5.3 Performance Verification Test

The Contractor shall demonstrate compliance of the HVAC control system with the contract documents. Using test plans and procedures previously approved by the Government, the Contractor shall demonstrate all physical and functional requirements of the project. The performance verification test shall show, step-by-step, the actions and results demonstrating that the control systems perform in accordance with the sequences of operation. The performance verification test shall not be started until after receipt by the Contractor of written permission by the Government, based on Government approval of the Commissioning Report and completion of balancing. The tests shall not be conducted during scheduled seasonal off periods of base heating and cooling systems.

3.5.4 Endurance Test

The endurance test shall be used to demonstrate the specified overall system reliability requirement of the completed system. The endurance test shall not be started until the Government notifies the Contractor in writing that the performance verification test is satisfactorily completed.

The Government may terminate the testing at any time when the system fails to perform as specified. Upon termination of testing by the Government or by the Contractor, the Contractor shall commence an assessment period as described for Phase II. Upon successful completion of the endurance test, the Contractor shall deliver test reports and other documentation as specified to the Government prior to acceptance of the system.

a. Phase I (Testing). The test shall be conducted 24 hours per day, 7 days per week, for 15 consecutive calendar days, including holidays, and the system shall operate as specified. The Contractor shall make no repairs during this phase of testing unless authorized by the Government in writing.

b. Phase II (Assessment). After the conclusion of Phase I, the Contractor shall identify failures, determine causes of failures, repair failures, and deliver a written report to the Government. The report shall explain in detail the nature of each failure, corrective action taken, results of tests performed, and shall recommend the point at which testing should be resumed. After delivering the written report, the Contractor shall convene a test review meeting at the jobsite to present the results and recommendations to the Government. As a part of this test review meeting, the Contractor shall demonstrate that all failures have been corrected by performing appropriate portions of the performance verification test. Based on the Contractor's report and test review meeting, the Government may require that the Phase I test be totally or partially rerun. After the conclusion of any retesting which the Government may require, the Phase II assessment shall be repeated as if Phase I had just been completed.

3.5.5 Posted and Panel Instructions

Posted and Panel Instructions, showing the final installed conditions, shall be provided for each system. The posted instructions shall consist of laminated half-size drawings and shall include the control system schematic, equipment schedule, sequence of operation, wiring diagram, communication network diagram, and valve and damper schedules. The posted instructions shall be permanently affixed, by mechanical means, to a wall near the control panel. Panel instructions shall consist of laminated letter-size sheets and shall include a Routine Maintenance Checklist and as-built configuration check sheets. Panel instructions and one copy of the Operation and Maintenance Manuals, previously described herein, shall be placed inside each control panel or permanently affixed, by mechanical means, to a wall near the panel.

3.6 TRAINING

3.6.1 Training Course Requirements

A training course shall be conducted for 10 operating staff members designated by the Contracting Officer in the maintenance and operation of the system, including specified hardware and software. The training period, for a total of 32 hours of normal working time, shall be conducted within 30 days after successful completion of the performance verification test. The training course shall be conducted at the project site. Audiovisual equipment and 10 sets of all other training materials and supplies shall be provided. A training day is defined as 8 hours of classroom instruction, including two 15 minute breaks and excluding lunchtime, Monday through Friday, during the daytime shift in effect at the training facility.

3.6.2 Training Course Content

For guidance in planning the required instruction, the Contractor shall assume that attendees will have a high school education or equivalent, and are familiar with HVAC systems. The training course shall cover all of the material contained in the Operating and Maintenance Instructions, the layout and location of each HVAC control panel, the layout of one of each type of unitary equipment and the locations of each, the location of each control device external to the panels, preventive maintenance, troubleshooting, diagnostics, calibration, adjustment, commissioning, tuning, and repair procedures. Typical systems and similar systems may be treated as a group, with instruction on the physical layout of one such system. The results of the performance verification test and the calibration, adjustment and commissioning report shall be presented as benchmarks of HVAC control system performance by which to measure operation and maintenance effectiveness.

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DESIGN AND CONSTRUCTION
MEDICAL/DENTAL CLINIC
SCHRIEVER AFB, CO

SOLICITATION NO. DACA45-02-R-0013
PN052320
RFP (FEBRUARY 2002)

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SECTION 16710

PREMISES DISTRIBUTION SYSTEM

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PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ELECTRONIC INDUSTRIES ALLIANCE (EIA)

ANSI/TIA/EIA-568-A	(1995) Commercial Building Telecommunications Cabling Standard
ANSI/TIA/EIA-568-A-5	(2000) Transmission Performance Specifications for 4-pair 100 ohm Category 5E Cabling
ANSI/TIA/EIA-569-A	(1998) Commercial Building Standard for Telecommunications Pathways and Spaces
ANSI/TIA/EIA-606	(1993) Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
ANSI/TIA/EIA-607	(1994) Commercial Building Grounding and Bonding Requirements for Telecommunications
TIA/EIA TSB 67	(1995) Transmission Performance Specifications for Field Testing of Unshielded Twisted-Pair Cabling Systems

IBM CORPORATION (IBM)

IBM GA27-3361-07	(1987) LAN Cabling System - Planning and Installation
IBM GA27-3773-0	(1987) Cabling System Technical Interface Specifications

INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)

ICEA S-80-576	(1994) Communications Wire and Cable for Wiring of Premises
ICEA S-83-596	(1994) Fiber Optic Premises Distribution Cable

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (1999) National Electrical Code

UNDERWRITERS LABORATORY (UL)

UL 50 (1995; Rev thru Nov 1999) Enclosures for
Electrical Equipment

1.2 SYSTEM DESCRIPTION

The premises distribution system shall consist of inside-plant horizontal, riser, and backbone cables and connecting hardware to transport telephone and data (including LAN) signals between equipment items in a building.

1.3 ENVIRONMENTAL REQUIREMENTS

Connecting hardware shall be rated for operation under ambient conditions of 0 to 60 degrees C and in the range of 0 to 95 percent relative humidity, noncondensing.

1.4 QUALIFICATIONS

1.4.1 Minimum Contractor Qualifications

All work under this section shall be performed by and all equipment shall be furnished and installed by a certified Telecommunications Contractor, hereafter referred to as the Contractor. The Contractor shall have the following qualifications in Telecommunications Systems installation:

- a. Contractor shall have a minimum of 3 years experience in the application, installation and testing of the specified systems and equipment.
- b. All supervisors and installers assigned to the installation of this system or any of its components shall have factory certification from each equipment manufacturer that they are qualified to install and test the provided products.
- c. All installers assigned to the installation of this system or any of its components shall have a minimum of 3 years experience in the installation of the specified copper and fiber optic cable and components.

1.4.2 Minimum Manufacturer Qualifications

The equipment and hardware provided under this contract will be from manufacturers that have a minimum of 3 years experience in producing the types of systems and equipment specified.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that

will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Premises Distribution System; G, AE.

Detail drawings including a complete list of equipment and material. Detail drawings shall contain complete wiring and schematic diagrams and other details required to demonstrate that the system has been coordinated and will function properly as a system. Drawings shall include vertical riser diagrams, equipment rack details, elevation drawings of telecommunications closet walls, outlet face plate details for all outlet configurations, sizes and types of all cables, conduits, and cable trays. Drawings shall show proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearance for maintenance and operation.

Record Drawings; G, AE.

Record drawings for the installed wiring system infrastructure per ANSI/TIA/EIA-606. The drawings shall show the location of all cable terminations and location and routing of all backbone and horizontal cables. The identifier for each termination and cable shall appear on the drawings.

SD-03 Product Data

Record Keeping and Documentation; G, AE.

Documentation on cables and termination hardware in accordance with ANSI/TIA/EIA-606.

Spare Parts; G, AE.

Lists of spare parts, tools, and test equipment for each different item of material and equipment specified, after approval of detail drawings, not later than 2 months prior to the date of beneficial occupancy. The data shall include a complete list of parts and supplies, with current unit prices and source of supply, and a list of spare parts recommended for stocking.

Manufacturer's Recommendations; G, AE.

Where installation procedures, or any part thereof, are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations, prior to installation shall be provided. Installation of the item will not be allowed to proceed until the recommendations are received and approved.

Test Plan; G, AE.

Test plan defining the tests required to ensure that the system meets technical, operational and performance specifications, 60 days prior to the proposed test date. The test plan must be approved before the start of any testing. The test plan shall identify the capabilities and functions to be tested, and include detailed instructions for the setup and execution of each test and procedures for evaluation and documentation of the results.

Qualifications; G, AE.

The qualifications of the Manufacturer, Contractor, and the Installer to perform the work specified herein. This shall include proof of the minimum qualifications specified herein.

SD-06 Test Reports

Test Reports; G, AE.

Test reports in booklet form with witness signatures verifying execution of tests. Test results will also be provided on 89 mm diskettes in ASCII format. Reports shall show the field tests performed to verify compliance with the specified performance criteria. Test reports shall include record of the physical parameters verified during testing. Test reports shall be submitted within 14 days after completion of testing.

SD-07 Certificates

Premises Distribution System; G, AE.

Written certification that the premises distribution system complies with the ANSI/TIA/EIA-568-A, ANSI/TIA/EIA-569-A, and ANSI/TIA/EIA-606 standards.

Materials and Equipment; G, AE.

Where materials or equipment are specified to conform, be constructed or tested to meet specific requirements, certification that the items provided conform to such requirements. Certification by a nationally recognized testing laboratory that a representative sample has been tested to meet the requirements, or a published catalog specification statement to the effect that the item meets the referenced standard, will be acceptable as evidence that the item conforms. Compliance with these requirements does not relieve the Contractor from compliance with other requirements of the specifications.

Installers; G, AE.

The Contractor shall submit certification that all the installers are factory certified to install and test the provided products.

1.6 DELIVERY AND STORAGE

Equipment delivered and placed in storage shall be stored with protection from the weather, humidity and temperature variation, dirt and dust or other contaminants.

1.7 OPERATION AND MAINTENANCE MANUALS

Commercial off the shelf manuals shall be furnished for operation, installation, configuration, and maintenance for all products provided as a part of the premises distribution system. Specification sheets for all cable, connectors, and other equipment shall be provided.

1.8 RECORD KEEPING AND DOCUMENTATION

1.8.1 Cables

A record of all installed cable shall be provided in hard copy format and on electronic media using DOS based computer cable management software per ANSI/TIA/EIA-606. A licensed copy of the cable management software including documentation shall be provided. The cable records shall include the required data fields for each cable and complete end-to-end circuit report for each complete circuit from the assigned outlet to the entry facility per ANSI/TIA/EIA-606.

1.8.2 Termination Hardware

A record of all installed patch panels and outlets shall be provided in hard copy format and on electronic media using DOS based computer cable management software per ANSI/TIA/EIA-606. A licensed copy of the cable management software including documentation shall be provided. The hardware records shall include only the required data fields per ANSI/TIA/EIA-606.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Materials and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products and shall be the manufacturer's latest standard design that has been in satisfactory use for at least 1 year prior to installation. Materials and equipment shall conform to the respective publications and other requirements specified below and to the applicable requirements of NFPA 70.

2.2 UNSHIELDED TWISTED PAIR CABLE SYSTEM

2.2.1 Horizontal Cable

Horizontal cable shall meet the requirements of ANSI/TIA/EIA-568-A-5 for Category 5e. Cable shall be label-verified. Cable jacket shall be factory marked at regular intervals indicating verifying organization and performance level. Cable shall be rated CMP per NFPA 70.

2.2.2 Connecting Hardware

Connecting and cross-connecting hardware shall be the same category or higher as the cable it serves. Hardware shall be in accordance with ANSI/TIA/EIA-568-A.

2.2.2.1 Telecommunications Outlets

Wall and desk outlet plates shall come equipped with three modular jacks, with the top or left jack labeled "voice" and the bottom jacks labeled "data." Modular jacks shall be the same category as the cable they terminate and shall meet the requirements of ANSI/TIA/EIA-568-A. Modular jack pin/pair configuration shall be T568B per ANSI/TIA/EIA-568-A. Modular jacks shall be unkeyed. Faceplates shall be provided and shall be stainless steel. Mounting plates shall be provided for system furniture and shall match the system furniture in color. Outlet assemblies used in the premises distribution system shall consist of modular jacks assembled into simplex outlet assemblies in single or double gang covers. The modular jacks shall conform to the requirements of ANSI/TIA/EIA-568-A, and shall be rated for use with Category 5e cable in accordance with ANSI/TIA/EIA-568-A-5 and shall meet the Link Test parameters as listed in TIA/EIA TSB 67 and supplemented by ANSI/TIA/EIA-568-A-5.

2.2.2.2 Patch Panels

Patch panels shall consist of eight-position modular jacks, with rear mounted type 110 insulation displacement connectors, arranged in rows or columns on 480 mm rack mounted panels. Jack pin/pair configuration shall be T568B per ANSI/TIA/EIA-568-A. Jacks shall be unkeyed. Panels shall be provided with labeling space. The modular jacks shall conform to the requirements of ANSI/TIA/EIA-568-A, and shall be rated for use with Category 5e cable in accordance with ANSI/TIA/EIA-568-A-5 and shall meet the Link Test parameters as listed in TIA/EIA TSB 67 and supplemented by ANSI/TIA/EIA-568-A-5.

2.2.2.3 Patch Cords

Patch cords shall be cable assemblies consisting of flexible, twisted pair stranded wire with eight-position plugs at each end. Cable shall be label-verified. Cable jacket shall be factory marked at regular intervals indicating verifying organization and performance level. Patch cords shall be wired straight through; pin numbers shall be identical at each end and shall be paired to match T568B patch panel jack wiring per ANSI/TIA/EIA-568-A. Patch cords shall be unkeyed. Patch cords shall be factory assembled. Patch cords shall conform to the requirements of ANSI/TIA/EIA-568-A-5 for Category 5e.

2.2.2.4 Terminal Blocks

Terminal blocks shall be wall mounted wire termination units consisting of insulation displacement connectors mounted in plastic blocks, frames or housings. Blocks shall be type 110 which meet the requirements of ANSI/TIA/EIA-568-A, and shall be rated for use with Category 5e cable in accordance with ANSI/TIA/EIA-568-A-5 and shall meet the Link Test parameters

as listed in TIA/EIA TSB 67 and supplemented by ANSI/TIA/EIA-568-A-5. Blocks shall be mounted on standoffs and shall include cable management hardware. Insulation displacement connectors shall terminate 22 or 24 gauge solid copper wire as a minimum, and shall be connected in pairs so that horizontal cable and connected jumper wires are on separate connected terminals.

2.3 FIBER OPTIC CABLE SYSTEM

2.3.1 Horizontal Distribution Cable

2.3.1.1 Multimode

Multimode fiber optic horizontal cable shall meet the requirements of ANSI/TIA/EIA-568-A and ICEA S-83-596 for 62.5/125 micrometer multimode graded index optical fiber cable. Numerical aperture for each fiber shall be a minimum of 0.275. Cable construction shall be tight buffered type, two strands. Individual fibers shall be color coded for identification. Cable shall be imprinted with fiber count, fiber type, and aggregate length at regular intervals of 1.0 m. Cable shall be rated and marked OFNP per NFPA 70.

2.3.2 Connecting Hardware

2.3.2.1 Connectors

Connectors shall be ST type with ceramic ferrule material with a maximum insertion loss of .5 dB. Connectors shall meet performance requirements of ANSI/TIA/EIA-568-A. Connectors shall be field installable. Connectors shall utilize adhesive for fiber attachment to ferrule. Connectors shall terminate fiber sizes as required for the service.

2.3.2.2 Patch Panels

Patch panels shall be a complete system of components by a single manufacturer, and shall provide termination, splice storage, routing, radius limiting, cable fastening, storage, and cross-connection. Patch panels shall be 480 mm rack mounted panels. Patch panels shall provide strain relief for cables. Panels shall be provided with labeling space. Patch panel connectors and couplers shall be the same type and configuration as used elsewhere in the system.

2.3.2.3 Patch Cords

Patch cords shall be cable assemblies consisting of flexible optical fiber cable with connectors of the same type as used elsewhere in the system. Optical fiber shall be the same type as used elsewhere in the system. Patch cords shall be complete assemblies from manufacturer's standard product lines.

2.4 EQUIPMENT RACKS

2.4.1 Floor Mounted Open Frame

Floor mounted equipment racks shall be aluminum relay racks with uprights to mount equipment 480 mm wide. Uprights shall be 75 mm deep channel, 32 mm wide, drilled and tapped 12-24 in a 13 mm pattern. Racks shall be provided with a standard top crossmember, and predrilled base plate to allow floor fastening. Open frame equipment racks shall be 2.1 m in height and clear coated. AC outlets shall be provided as shown.

2.4.2 Cable Guides

Cable guides shall be specifically manufactured for the purpose of routing cables, wires and patch cords horizontally and vertically on 480 mm equipment racks. Cable guides shall consist of D-ring or bracket-like devices mounted on rack panels for horizontal use or individually mounted for vertical use. Cable guides shall mount to racks by screws and/or nuts and lockwashers.

2.5 EQUIPMENT MOUNTING BACKBOARD

Plywood backboards shall be provided, sized as shown, painted with white or light colored paint.

2.6 TELECOMMUNICATIONS OUTLET BOXES

Electrical boxes for telecommunication outlets shall be 117 mm square by 53 mm deep with minimum 9 mm deep single or two gang plaster ring as shown. Provide a minimum 25 mm conduit.

2.7 PROTECTOR MODULES

The protector modules shall be of the two-element gas tube type. Protection modules shall be heavy duty, $A > 10$ kA, $B > 400$, $C > 65A$ where A is the maximum single impulse discharge current, B is the impulse life and C is the AC discharge current per ANSI C62.61. The gas modules shall shunt high voltage to ground, fail short, be equipped with an external spark gap and heat coils, and shall comply with UL 497.

PART 3 EXECUTION

3.1 INSTALLATION

System components and appurtenances shall be installed in accordance with NFPA 70, manufacturer's instructions and as shown. Necessary interconnections, services, and adjustments required for a complete and operable signal distribution system shall be provided. Components shall be labeled in accordance with ANSI/TIA/EIA-606. Penetrations in fire-rated construction shall be firestopped in accordance with Section 07840 FIRESTOPPING. Conduits, outlets and raceways shall be installed in accordance with Section 16415 ELECTRICAL WORK, INTERIOR. Wiring shall be installed in accordance with ANSI/TIA/EIA-568-A and as specified in Section 16415 ELECTRICAL WORK, INTERIOR. Wiring, and terminal blocks and outlets shall be marked in accordance with ANSI/TIA/EIA-606. Cables shall not be

installed in the same cable tray, utility pole compartment, or floor trench compartment with ac power cables. Cables not installed in conduit or wireways shall be properly secured and neat in appearance and, if installed in plenums or other spaces used for environmental air, shall comply with NFPA 70 requirements for this type of installation.

3.1.1 Horizontal Distribution Cable

The rated cable pulling tension shall not be exceeded. Cable shall not be stressed such that twisting, stretching or kinking occurs. Cable shall not be spliced. Cables shall be installed either in conduit or through type cable trays to prevent microbending losses. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items. Placement of cable parallel to power conductors shall be avoided, if possible; a minimum separation of 300 mm shall be maintained when such placement cannot be avoided. Cables shall be terminated; no cable shall contain unterminated elements. Minimum bending radius shall not be exceeded during installation or once installed. Cable ties shall not be excessively tightened such that the transmission characteristics of the cable are altered.

3.1.2 Telecommunications Outlets

3.1.2.1 Faceplates

As a minimum each jack shall be labeled as to its function and a unique number to identify cable link.

3.1.2.2 Cables

Unshielded twisted pair and fiber optic cables shall have a minimum of 150 mm of slack cable loosely coiled into the telecommunications outlet boxes. Minimum manufacturers bend radius for each type of cable shall not be exceeded.

3.1.2.3 Pull Cords

Pull cords shall be installed in all conduit serving telecommunications outlets which do not initially have fiber optic cable installed.

3.1.3 Terminal Blocks

Terminal blocks shall be mounted in orderly rows and columns. Adequate vertical and horizontal wire routing areas shall be provided between groups of blocks. Industry standard wire routing guides shall be utilized.

3.1.4 Unshielded Twisted Pair Patch Panels

Patch panels shall be mounted in equipment racks with sufficient modular jacks to accommodate the installed cable plant plus 10 percent spares. Cable guides shall be provided above, below and between each panel.

3.1.5 Fiber Optic Patch Panels

Patch panels shall be mounted in equipment racks with sufficient ports to accommodate the installed cable plant plus 10 percent spares. A slack loop of fiber shall be provided within each panel. Loop shall be 900 mm in length. The outer jacket of each cable entering a patch panel shall be secured to the panel to prevent movement of the fibers within the panel, using clamps or brackets specifically manufactured for that purpose.

3.1.6 Equipment Racks

Open frame equipment racks shall be bolted to the floor slab. Cable guides shall be bolted or screwed to racks. Racks shall be installed level. Ganged racks shall be bolted together. Ganged rack cabinets shall have adjacent side panels removed. Wall mounted racks shall be secured to the mounting surface to prevent fully loaded racks from separating from the mounting surface.

3.1.7 Rack Mounted Equipment

Equipment to be rack mounted shall be securely fastened to racks by means of the manufacturer's recommended fasteners.

3.2 TERMINATION

Cables and conductors shall sweep into termination areas; cables and conductors shall not bend at right angles. Manufacturer's minimum bending radius shall not be exceeded. When there are multiple system type drops to individual workstations, relative position for each system shall be maintained on each system termination block or patch panel.

3.2.1 Unshielded Twisted Pair Cable

Each pair shall be terminated on appropriate outlets, terminal blocks or patch panels. No cable shall be unterminated or contain unterminated elements. Pairs shall remain twisted together to within the proper distance from the termination as specified in ANSI/TIA/EIA-568-A. Conductors shall not be damaged when removing insulation. Wire insulation shall not be damaged when removing outer jacket.

3.2.2 Fiber Optic Cable

Each fiber shall have connectors installed. The pull strength between the connector and the attached fiber shall be not less than 11.3 kg. The mated pair loss, without rotational optimization, shall not exceed 1.0 dB. Fiber optic connectors shall be installed per ANSI/TIA/EIA-568-A.

3.3 GROUNDING

Signal distribution system ground shall be installed in the telecommunications entrance facility and in each telecommunications closet in accordance with ANSI/TIA/EIA-607 and Section 16415 ELECTRICAL WORK, INTERIOR. Equipment racks shall be connected to the electrical safety ground.

3.4 ADDITIONAL MATERIALS

The Contractor shall provide the following additional materials required for facility startup.

- a. 10 of each type outlet.
- b. 10 of each type cover plate.
- c. 1 of each type terminal block for each telecommunications closet.
- d. One patch cord of 3 m length for each telecommunications outlet.
- e. One fiber optic patch cord, 3 m length for each system requiring connection (i.e., security, fire alarm, building management, etc.).
- f. 1 Set of any and all special tools required to establish a cross connect and to change and/or maintain a terminal block.

3.5 ADMINISTRATION AND LABELING

3.5.1 Labeling

3.5.1.1 Labels

All labels shall be in accordance with ANSI/TIA/EIA-606.

3.5.1.2 Cable

All cables will be labeled using color labels on both ends with encoded identifiers per ANSI/TIA/EIA-606.

3.5.1.3 Termination Hardware

All workstation outlets and patch panel connections will be labeled using color coded labels with encoded identifiers per ANSI/TIA/EIA-606.

3.6 TESTING

Materials and documentation to be furnished under this specification are subject to inspections and tests. All components shall be terminated prior to testing. Equipment and systems will not be accepted until the required inspections and tests have been made, demonstrating that the signal distribution system conforms to the specified requirements, and that the required equipment, systems, and documentation have been provided.

3.6.1 Unshielded Twisted Pair Tests

All metallic cable pairs shall be tested for proper identification and continuity. All opens, shorts, crosses, grounds, and reversals shall be corrected. Correct color coding and termination of each pair shall be verified in the communications closet and at the outlet. Horizontal wiring shall be tested from and including the termination device in the communications closet to and including the modular jack in each room. Backbone wiring shall be tested end-to-end, including termination devices,

from terminal block to terminal block, in the respective communications closets. These test shall be completed and all errors corrected before any other tests are started.

3.6.2 Category 5e Circuits

All category 5e circuits shall be tested using a test set that meets the Class II accuracy requirements of TIA/EIA TSB 67 standard, including the additional tests and test set accuracy requirements of ANSI/TIA/EIA-568-A-5. Testing shall use the Basic Link Test procedure of TIA/EIA TSB 67, as supplemented by ANSI/TIA/EIA-568-A-5. Cables and connecting hardware which contain failed circuits shall be replaced and retested to verify the standard is met.

3.6.3 Fiber Optic Cable

Unless stated otherwise, tests shall be performed from both ends of each circuit. Connectors shall be visually inspected for scratches, pits or chips and shall be reterminated if any of these conditions exist. Each circuit leg and complete circuit shall be tested for insertion loss at 850 and 1300 nm using a light source similar to that used for the intended communications equipment. High-resolution optical time domain reflectometer (OTDR) tests shall be performed from one end of each fiber. Scale of the OTDR trace shall be such that the entire circuit appears over a minimum of 80 percent of the X-axis.

-- End of Section --

SECTION 16750

NURSE CALL SYSTEM
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SECTION 16750

NURSE CALL SYSTEM
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PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C62.41 (1991) Surge Voltages in Low-Voltage AC Power Circuits

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (1996) National Electrical Code

UNDERWRITERS LABORATORIES (UL)

UL 50 (1995; Rev Oct 1996) Enclosures for Electrical Equipment

UL 1069 (1996) Hospital Signaling and Nurse Call Equipment

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Nurse Call System; G, AE
Installation; G, AE

Detail drawings consisting of a complete list of equipment and materials, including manufacturer's descriptive and technical literature, performance charts, catalog cuts, and UL listing cards. Detail drawings shall include a written description of operation for each system and subsystem in each of the various operating modes and a system riser diagram for the total system including each audio-visual and surgical medical area indicating appropriate interconnections with other portions of the system. Block diagrams will not be acceptable. The riser diagram shall include all conduit and conductors between the various pieces of equipment, and elevation or plan showing physical location and dimensions of each

individual component. Individual specification data sheets for each piece of system equipment shall be provided, indicating the type, dimensions, electro-characteristics, method of mounting, finishes, voltage and phase, power required, and any specific cooling requirements. Data sheets shall be cross-referenced to riser diagram, and shall include operating temperature limits, heat dissipated, and electrical requirements for each piece of equipment, and mounting restrictions for the equipment. Where the equipment is to be installed in millwork, detailed cutout drawings and detailed opening drawings for each piece of equipment shall be provided.

SD-03 Product Data

Tests; G, AE
Factory Test; G, AE

Test plan and test procedures for the factory and site tests. The test plan and test procedures shall explain in detail, step-by-step actions and expected results to demonstrate compliance with the requirements of this specification, and the methods for simulating the necessary conditions of operation to demonstrate performance of the system. Test plan documentation for the factory test, 150 days prior to the factory test. Test procedures and report documentation for the factory test, after receipt of written approval for the test plan and 90 days prior to the scheduled factory test. Test plan documentation for the site test, 150 days prior to the site tests. Test procedure and report documentation for the site tests, after receipt of written approval of the test plan.

SD-06 Test Reports

Tests; G, AE

Test reports in booklet form, upon completion and testing of the installed system. Each test report shall indicate the final position of controls and operation mode of the equipment, and the manufacturer, model number, and serial number of test equipment used in each test.

SD-10 Operation and Maintenance Data

Nurse Call System; G, AE

Six complete copies of operating instructions outlining the step-by-step procedures required for system startup operation and shutdown. Six complete copies of maintenance instructions listing routine maintenance procedures, possible breakdown and repairs, and troubleshooting guides. Final copies of the manuals bound in hardback, loose-leaf binders, within 30 days after completing the site test. A draft copy of the manuals, with the test plan and test procedures for use during site tests. The manuals shall be updated with any changes required prior to final delivery of the manuals. Each manual's contents shall be identified on the cover.

The manuals shall include the name, address, and telephone number of each subcontractor installing equipment and systems, and of the nearest service representative for each item of equipment and each system. The manuals shall have a table of contents and tab sheets. Tab sheets shall be placed at the beginning of each chapter or section and at the beginning of each appendix. The final copies delivered after completion of the site test shall include all modifications made during installation, checkout, and acceptance. Manuals provided shall include:

- a. Functional Design Manual.
- b. Equipment Manual.
- c. Operator's Manual.
- d. Maintenance Manual.

The functional design manual shall identify the operational requirements for the system and explain the theory of operation, design philosophy, and specific functions. A description of hardware and software functions, interfaces, and requirements shall be included for all system operating modes.

The hardware manual shall describe all equipment provided, including:

- a. General description and specifications.
- b. Installation and checkout procedures.
- c. Equipment electrical schematics and layout drawings.
- d. System schematics.
- e. Manufacturer's repair parts list indicating sources of supply. Include Federal Stock Number when obtainable from the manufacturer.

1.3 GENERAL REQUIREMENTS

1.3.1 General

The nurse call system shall be a system conforming to UL 1069 and utilizing UL approved equipment where available.

1.3.2 Power Line Surge Protection

All equipment connected to ac circuits shall be protected from power line surges. Equipment protection shall meet the requirements of IEEE C62.41. Fuses shall not be used for surge protection.

1.3.3 Verification of Dimensions

The Contractor shall become familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing the work.

1.4 SYSTEM PERFORMANCE

1.4.1 Visual Nurse Call System

Hardwired system which shall provide audible signaling and visual annunciation of emergency or code calls, utilizing light and tone signals. Type and location of equipment shall be as indicated.

PART 2 PRODUCTS

2.1 SYSTEM EQUIPMENT

2.1.1 General

The system equipment shall include all devices, components, and wiring necessary to perform the functions specified. If the equipment space or power requirements exceed that shown, necessary adjustments to the installation to accommodate the equipment shall be made as approved.

2.1.2 Materials and Equipment

Units of the same type of equipment shall be products of a single manufacturer. Each major component of equipment shall have the manufacturer's name and address, and the model and serial number in a conspicuous place.

2.1.3 Cabinet Wiring

Items, devices and components shall be securely mounted, identified, and conveniently arranged for servicing. Wiring shall be secured on identified terminals, color coded or otherwise identified, and shall be neatly formed, cabled, and laced or clamped in position in the cabinet. Operating controls and devices shall be located in a single unit nurse control station. The nurse control station shall be enclosed in a desktop box with a plastic laminate finish in an approved color, and shall be cable connected to the control cabinet.

2.1.4 Calling Stations

Stations shall perform the functions specified. Each station shall consist of a flush-mounted back box, an equipment submounting plate, and either a satin finish stainless steel, or an ABS or equal plastic faceplate. Faceplates shall be mounted on the outlet box with countersunk corrosion-resisting steel screws. Mounting height shall be as shown.

2.1.4.1 Emergency Station

Emergency station shall be either pull cord or push button type as shown. The pull cord locking-type shall contain a manual reset button, red call-

placed lamp and locking type switch. Station shall be clearly identified as a calling station with manufacturer's standard lettering on the plate. The push button type shall have a locking type push button mounted. A red indicator light shall flash when the push button is operated.

2.1.5 Dome Lights

Dome light shall be generally used with toilet and emergency stations, and shall have red light and integral chime.

2.1.6 System Power Supply

The system power supply shall be surface mounted, located as shown and shall supply 24 Vdc power for operation of the call system. The supply shall operate between 0 and 49 degrees C on a continuous duty basis from a primary line voltage between 105 to 125 Vac, 60 Hz. The output shall be regulated 24 Vdc with protection against overloads. Line to load regulation shall not exceed 2-1/2 percent with ripple and noise remaining below the 10 mV rms level. Output protection against overload or shorts shall be provided by an electronic fold-back circuit set to limit the volt-ampere output to less than 100 VA. The power output shall be restored automatically upon removal of overload without resetting circuit breakers or replacing fuses.

2.1.7 Standby Power Supply

A standby power supply shall be provided and mounted into the same backbox as the systems power supply providing full, uninterrupted operating power to the system in case of primary power or power supply failure. Failure of primary ac power or failure of the system power supply shall cause the standby supply to automatically transfer into the system without interruption and maintain full operation of the system, both light/tone signals and two-way voice communication. The output shall maintain 24 Vdc at full load for a minimum of 6 minutes. The standby shall then automatically transfer out of the system. The battery pack shall be completely sealed and require no maintenance or periodical discharge and recharge cycling. The battery shall be protected against system overload or shorts. A built-in float charger operating from 120 Vac shall be provided to float charge the batteries during normal operating conditions. Control terminals shall provide remote light and tone indications for primary or supply failure, system overload or shorts, and/or battery disconnect.

2.2 MATERIALS

2.2.1 Cabinets and Special Back Boxes

Cabinets and boxes shall be provided to suit the equipment, and shall be metal enclosures with covers in accordance with UL 1069 and UL 50. The Contractor shall provide the correct boxes for all nurse call equipment.

2.2.2 Cabinet Rim and Faceplates

Rims and faceplates shall be provided to suit the equipment, and shall be satin-finished corrosion-resisting steel with beveled edges.

2.2.3 Cables and Conductors

Cables and multiconductor wiring, shielded and unshielded, for low-voltage signaling and audio circuits shall be provided to suit the equipment. Coaxial and shielded cable shall be type and size as recommended by the system manufacturer.

2.3 DIAGNOSTIC PROGRAMS

Diagnostic programs that will report all failures of the system and failures of peripherals on the system shall be provided.

2.4 FACTORY TEST

2.4.1 General

The Contractor shall assemble the factory test setup as specified and perform tests to demonstrate that the performance of the system satisfies the requirements of this specification in accordance with the approved factory test procedures. The factory test shall take place during regular first shift working hours on weekdays. Model numbers of equipment tested shall be identical to those to be delivered to the site. A list of all test equipment to be used shall be furnished by the Contractor. Original copies of all data produced during factory testing shall be delivered to the Government at the conclusion of testing prior to Government approval of the test. Upon successful completion and receipt by the Contractor of written approval by the Government of the factory test, system equipment may be shipped to the project site for installation.

2.4.2 Test Setup

The factory test setup shall include the following:

- a. One of each type of station specified.
- b. One appropriate dome light for each station.
- c. One cord set for each station.
- d. System power supply.
- e. Standby power supply.

PART 3 EXECUTION

3.1 INSTALLATION

The installation of the system described shall be performed in accordance with manufacturer's instructions.

3.1.1 Electrical Work

Raceways, outlet boxes, pull boxes, and power conductors shall be in accordance with Section 16415 ELECTRICAL WORK, INTERIOR.

3.1.2 Grounding

Equipment enclosures and all other noncurrent carrying metal parts of electric equipment shall be grounded.

3.1.3 System Wiring

System wiring shall be in accordance with UL 1069, and NFPA 70. Where multiconductor or coaxial cable is used, installation, wiring and connections shall be in accordance with manufacturer's instructions and diagrams. Cables shall be installed without kinks, sharp bends or deformations, in a manner to prevent abrasion, and shall be not less than 300 mm clear from any electric cable or telephone line or equipment. Wiring shall be run in rigid or intermediate zinc-coated-steel conduit or electrical metallic tubing with fill not exceeding 40 percent.

3.2 TESTS

The Contractor is responsible for providing all personnel, equipment, instrumentation, and supplies necessary to perform all testing. Notification of any planned testing shall be given to the Government at least 15 days prior to any test, and in no case shall notice be given until after the Contractor has received written Government approval of the test plans and procedures as specified. After the installation is completed and approval received, the Contractor shall conduct operating tests for approval and acceptance. Parts and components which fail during the tests shall be replaced with new ones. The Contractor shall furnish instruments and personnel required for the tests, and the Government will furnish the necessary electric power.

3.3 TRAINING COURSES

The Contractor shall conduct two training courses. One 2-hour training course shall be for the nursing staff, the other will be a 4-hour technical course for the maintenance staff. The training periods shall start after the system is functionally complete, and immediately prior to the final acceptance tests. Each course shall cover all items contained in the operating and maintenance instructions. The Contractor shall also provide a video tape of each training course, to be used as a refresher or to train new personnel.

-- End of Section --

SECTION 16770

PUBLIC ADDRESS SYSTEMS
07/89

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SECTION 16770

PUBLIC ADDRESS SYSTEMS
07/89

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ELECTRONIC INDUSTRIES ASSOCIATION (EIA)

EIA ANSI/EIA/310-D (1992) Cabinets, Racks, Panels, and
Associated Equipment

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (1999) National Electrical Code

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Radio and Public Address System; G, AE
Installation; G, AE

Detail drawings consisting of a complete list of equipment and material, including manufacturer's descriptive and technical literature, performance charts and curves, catalog cuts, and installation instructions. Detail drawings shall also contain complete wiring and schematic diagrams and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Drawings shall show proposed layout of equipment and appurtenances, and equipment relationship to other parts of the work including clearances for maintenance and operation.

Detail drawings consisting of a complete list of equipment and material, including manufacturer's descriptive and technical literature, performance charts and curves, catalog cuts, and installation instructions. Detail drawings shall also contain complete wiring and schematic diagrams and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Drawings shall show proposed layout of equipment and appurtenances, and equipment relationship

to other parts of the work including clearances for maintenance and operation.

SD-03 Product Data

Spare Parts; G, AE

Spare parts data for each different item of material and equipment specified, after approval of the detail drawings and not later than 2 months prior to the date of beneficial occupancy. The data shall include a complete list of parts and supplies, with current unit prices and source of supply.

SD-06 Test Reports

Approved Test Procedures; G, AE

Test plan and test procedures for the acceptance tests. The test plan and test procedures shall explain in detail, step-by-step actions and expected results to demonstrate compliance with the requirements specified. The procedure shall also explain methods for simulating the necessary conditions of operation to demonstrate system performance.

Acceptance Tests; G, AE

Test reports in booklet form showing all field tests performed to adjust each component and to prove compliance with the specified performance criteria, upon completion and testing of the installed system. The reports shall include the manufacturer, model number, and serial number of test equipment used in each test. Each report shall indicate the final position of controls and operating mode of the system.

SD-10 Operation and Maintenance Data

Public Address System; G, AE

Six copies of the operation manual outlining the step-by-step procedures required for system start up, operation, and shutdown. The manual shall include equipment layout and schematics of simplified wiring and control diagrams of the system as installed, the manufacturer's name, model number, and brief description of all equipment and their basic operating features. Six copies of maintenance manual listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The manual shall include equipment layout and schematics and simplified wiring and control diagrams of the system.

1.3 SYSTEM DESCRIPTION

1.3.1 Single Channel System

The system shall control and amplify an audio program for distribution within the areas indicated. Components of the system shall include a mixer-amplifier, power amplifier, telephone paging interface, speaker system, cabling, and other associated hardware.

1.3.2 System Performance

The system shall provide even sound distribution throughout the designated area, plus or minus 3 dB for the 1-octave band centered at 4000 Hz. The system shall provide uniform frequency response throughout the designated area, plus or minus 3 dB as measured with 1/3-octave bands of pink noise at locations across the designated area selected by the Contracting Officer. The system shall be capable of delivering 75 dB average program level with additional 10 dB peaking margin sound pressure level (SPL) to any location in the area at an acoustic distortion level below 5 percent total harmonic distortion (THD). Unless otherwise specified the sound pressure reference level is 20 micro Pascal (0.00002 Newtons per square meter).

1.4 DELIVERY AND STORAGE

Equipment placed in storage until installation time shall be stored with protection from the weather, humidity and temperature variations, dirt and dust, and other contaminants.

1.5 VERIFICATION OF DIMENSIONS

The Contractor shall become familiar with the details of the work and working conditions, shall verify dimensions in the field, and shall advise the Contracting Officer of any discrepancies before performing the work.

PART 2 PRODUCTS

2.1 STANDARD PRODUCTS

Material and equipment to be provided shall be the standard products of a manufacturer regularly engaged in the manufacture of such products, and shall essentially duplicate material and equipment that have been in satisfactory use at least 2 years. All components used in the system shall be commercial designs that comply with the requirements specified. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site.

2.1.1 Identical Items

Items of the same classification shall be identical. This requirement includes equipment, modules, assemblies, parts, and components.

2.1.2 Nameplates

Each major component of equipment shall have the manufacturer's name, address, model and catalog number, and serial number on a plate secured to the equipment.

2.2 MIXER AMPLIFIER

Mixer amplifier shall as a minimum conform to the following specifications:

Rated Power Output:	100 watts RMS
Frequency Response:	Plus or Minus 2 dB, 60-13,000 Hz
Distortion:	Less than 1 percent at RPO, 60 - 13,000 Hz
Inputs:	2 microphones (high impedance or low-impedance unbalanced) 2 Aux. (high-impedance)
Output Impedance:	Balanced 4, 8, and 16 ohms
Output Voltage:	25 and 70 volts
Power Requirement:	110-125 Vac 60 Hz

2.3 TELEPHONE PAGING INTERFACE

Telephone paging interface shall as a minimum conform to the following:

Access Methods:	Centrex, Loop Start, or Ground Start
Input:	600 ohm, 75-105 Vac, 20 or 30 Hz
Output:	600 Ohm
Connections:	Type 66.
Time Out Release:	1, 4, 8, 16, 32 or 64 seconds
Power:	120 Vac, 60 Hz

2.4 LOUDSPEAKERS

2.4.1 Cone Speaker

The cone speaker shall as a minimum conform to the following specifications:

Application:	Ceiling
Frequency range:	60 to 12,000 Hz

Power Rating:	Normal - 7 watts Peak - 10 watts
Voice Coil Impedance:	8 ohms
Line Matching Transformer Type:	25/70 volt line
Capacity:	2 watts
Magnet:	8 ounces or greater
Primary Taps:	0.5, 1, and 2 watts
Primary Impedance:	25 volts - 1250, 625, and 312 ohms 70 volts - 10k, 5k, and 2.5k ohms
Frequency Response:	30 - 20,000 Hz
Insertion Loss:	Less than 1 dB

2.5 SWITCHES AND CONTROLS

2.5.3 Remote Loudspeaker Volume Controls

Remote volume controls shall be an auto transformer type with detented 3 dB steps and an OFF position. The controls shall be wall-mounted in single-gang outlet boxes and furnished with engraved switching plates finished to match approved finish of electrical wall switches. Insertion loss of the controls shall not exceed 0.6 dB and the power-handling capacities of the control shall be 10 watts.

2.6 EQUIPMENT RACKS

2.6.1 Wall Mounted Cabinets

Wall mounted cabinets shall conform to UL 50 and have boxes constructed of zinc-coated sheet steel with dimensions not less than shown on drawings. Trim shall be fitted with hinged door and flush catch. Doors shall provide maximum openings to the box interiors. Boxes shall be provided with 19 mm plywood backboard painted white or a light color. A duplex AC outlet shall be installed within the cabinet.

2.7 SPEAKER AND MICROPHONE CABLE

Cables shall be of the gauge required depending upon the cable run length. In no case shall any cable be used which is smaller than 20 AWG. Insulation on the conductors shall be polyvinyl chloride (PVC) or an equivalent synthetic thermoplastic not less than 0.2 mm. Cables shall be shielded with a 34-gauge tinned soft copper strand formed into a braid. Cables shall be jacketed with a Fluoropolymer compound. The jacket thickness shall be 0.5 mm minimum.

2.8 POWER SURGE PROTECTION

Major components of the system such as power amplifiers, mixer-preamplifiers, phonographs, and tuners, shall have a device, whether internal or external, which provides protection against voltage spikes and current surges originating from commercial power sources.

2.9 SIGNAL SURGE PROTECTION

Major components of the system shall have internal protection circuits which protects the component from mismatched loads, direct current, and shorted output lines.

PART 3 EXECUTION

3.1 INSTALLATION

All equipment shall be installed as indicated and specified, and in accordance with the manufacturer's recommendations except where otherwise indicated. Equipment mounted out-of-doors or subject to inclement conditions shall be weatherproofed.

3.1.1 Wiring

Wiring shall be installed in rigid conduit, intermediate metal conduit, cable trays, or electric metallic tubing as specified in Section 16415ELECTRICAL WORK, INTERIOR. Wiring for microphone, grounding, line level, video, speaker and power cables shall be isolated from each other by physical isolation and metallical shielding. Shielding shall be terminated at only one end.

3.2 GROUNDING

All grounding practices shall comply with NFPA 70. The antenna mast shall be separately grounded. The system shall utilize a multiple-point signal grounding scheme where conductive path connections are required between each piece of equipment and the reference ground point. An isolated ground bar for power shall be provided for the connection of the main system components. The ground bar shall be connected to the main service ground utilizing a No. 6 conductor.

3.3 ACCEPTANCE TESTS

After installation has been completed, the Contractor shall conduct acceptance tests, utilizing the approved test procedures, to demonstrate that equipment operates in accordance with specification requirements. The Contractor shall notify the Contracting Officer 14 days prior to the performance of tests. In no case shall notice be given until after the Contractor has received written Contracting Officer approval of the test plans as specified. The acceptance tests shall include originating and receiving messages at specified stations, at proper volume levels, without cross talk or noise from other links or nondesignated units.

DESIGN AND CONSTRUCTION
MEDICAL/DENTAL CLINIC
SCHRIEVER AFB, CO

SOLICITATION NO. DACA45-02-R-0013
PN052320
RFP (FEBRUARY 2002)

3.4 TRAINING

The Contractor shall conduct a training course for 4 members of the operating and maintenance staff as designated by the Contracting Officer. The training course will be given at the installation during normal working hours for a total of 2 hours and shall start after the system is functionally complete but prior to final acceptance tests. The field instructions shall cover all of the items contained in the approved operating and maintenance manuals, as well as demonstrations of routine maintenance operations. The Contracting Officer shall be notified at least 14 days prior to the start of the training course.

-- End of Section --

SECTION 16781

TELEVISION DISTRIBUTION SYSTEM (TVDS)
04/89

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SECTION 16781

TELEVISION DISTRIBUTION SYSTEM (TVDS)

04/89

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

CODE OF FEDERAL REGULATIONS (CFR)

47 CFR 15	Radio Frequency Devices
47 CFR 17	Construction, Marking, and Lighting of Antenna Structures
47 CFR 25	Satellite Communications
47 CFR 76	Cable Television Service

ELECTRONIC INDUSTRIES ASSOCIATION (EIA)

EIA ANSI/EIA/TIA-222-F	(1996) Structural Standards for Steel Antenna Towers and Antenna Supporting Structures
EIA ANSI/EIA-411-A	(1986) Electrical and Mechanical Characteristics of Earth Station Antennas for Satellite Communications

FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 70/7460-1	(Rev J) Obstruction Marking and Lighting
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INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE)

IEEE C2	(1997) National Electrical Safety Code
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NATIONAL CABLE TELEVISION ASSOCIATION (NCTA)

NCTA-02	(1989; Revised Oct 1993) NCTA Recommended Practices for Measurements on Cable Television Systems
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NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(1996) National Electrical Code
NFPA 780	(1995) Installation of Lightning Protection Systems

UNDERWRITERS LABORATORIES (UL)

UL 467

(1993; Rev thru Aug 1996) Grounding and
Bonding Equipment

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Television Distribution System; G, AE
Installation; G, AE

System design drawings conforming to NCTA-02. Detail drawings consisting of a complete list of equipment and material, including manufacturer's descriptive and technical literature, performance charts and curves, catalog cuts, and installation instructions. Detail drawings shall contain complete wiring and schematic diagram, equipment layout and anchorage, and any other details required to demonstrate that the system has been coordinated and will function properly as a unit.

SD-03 Product Data

Spare Parts; G, AE

Spare parts data for each different item of material and equipment specified, after approval of the detail drawings and not later than 2 months prior to the date of beneficial occupancy. The data shall include a suggested list of spare parts and supplies, with current unit prices and source of supply.

SD-06 Test Reports

Approved Test Plan; G, AE

Test procedures and plans, 30 days prior to proposed test date. The plan shall conform to NCTA-02 and include proposed methods of documenting test results.

Testing; G, AE

Test reports in booklet form showing all field tests performed to adjust each component and all acceptance tests performed to prove compliance with the specified performance criteria, upon completion and testing of the installed system. Each test report shall indicate the final position of controls.

SD-10 Operation and Maintenance Data

Television Distribution System; G, AE

Six copies of the operation manual outlining the step-by-step procedures required for system startup, operation and shutdown. The manual shall include equipment layout and schematics of simplified wiring and control diagrams of the system as installed, the manufacturer's name, model number, and a brief description of equipment and components and their basic operating features. Six copies of the maintenance manual listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The manual shall include equipment layout and schematics and simplified wiring and control diagrams of the system as installed.

1.3 GENERAL REQUIREMENTS

1.3.1 Standard Products

Equipment and materials shall be standard products of a manufacturer regularly engaged in the manufacture of such products and shall be the manufacturer's latest standard design in satisfactory use for at least 2 years prior to bid opening. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site.

1.3.2 Identical Items

Items of the same classification shall be identical. This requirement includes equipment, modules, assemblies, parts, and components.

1.3.3 Nameplates

Each major component of equipment shall have the manufacturer's name, address, model and catalog number, and serial number on a plate secured to the equipment.

1.3.4 Verification of Dimensions

The Contractor shall become familiar with the details of the work and working conditions, shall verify dimensions in the field, and shall advise the Contracting Officer of any discrepancies before performing the work.

1.4 SYSTEM DESCRIPTION

The television distribution system for transmission to the end users via a coaxial cable distribution system. The system shall utilize industry standard, commercially available antenna systems and solid state electronic active and passive devices to receive and distribute the RF signals to the end user and meet the specifications and requirements listed herein. The system shall comply with 47 CFR 15, 47 CFR 25, and 47 CFR 76. All equipment used shall be designed for commercial and industrial applications. The system shall be designed to provide continuous entertainment on a series of CATV channels selectable by the users.

1.4.1 System Configuration

The system shall consist of cable distribution equipment.

1.4.1.1 Cable Distribution System

The cable distribution system shall consist of coaxial cables, user interfaces, signal taps and splitters [, RF amplifiers,] signal equalizers, and ancillary hardware as required to meet the system requirements specified.

1.4.1.2 System Hardware Design

The system hardware shall utilize modular plug-in components to provide maximum flexibility, ease of maintenance, and expansion where practicable.

Solid state and integrated circuitry containing silicon-based materials shall be employed to the maximum practicable extent. Mechanical and electro-mechanical relays, tuning controls, and other mechanical components and parts shall not be used where the necessary functions can be performed in a more reliable manner by electronic components.

1.4.1.3 Maintenance Accessibility

Parts which require periodic service or maintenance shall be easily accessible. Components in the headend equipment requiring tuning adjustments shall be externally accessible from the front of equipment and racks.

1.4.1.4 System Design

The system shall be designed to accommodate future expansion without service interruption.

- a. The distribution equipment shall be configured as indicated. All components in the distribution system shall as a minimum be capable of distributing 60 CATV channels (2-YY(61) low, mid, high, super and ultra band).

1.4.2 System Performance

The system shall be designed to receive the existing cable television feed. The system shall deliver to all user input interfaces the performance requirements specified in TABLE II.

TABLE II USER INPUT INTERFACE

Television Receiver Input Interface

Impedance:	75 ohms unbalanced
RF Video Carrier Level:	
Minimum	6 dBmV
Maximum	12 dBmV
Relative RF Video Carrier Level:	Within 3 dB to adjacent channel All channels within 12 dB
Carrier Level Stability:	
Short-term (1 hour)	Within 0.5 dB maximum
Long-term (24 hours)	Within 2.0 dB maximum
Frequency range (MHz):	54-[220] [300] [330] [400] [450]
Frequency Response:	
Peak to Valleys for System Bandpass	Plus or minus 3 dB
Across any 6 MHz Channel referenced to video carrier plus 200 kHz sideband amplitude	Plus or minus 1 dB
Carrier to Noise Ratio:	Greater than or equal to 45 dB
Cross modulation (NTCA Test Method):	Less than minus 50 dB
Carrier to Echo Ratio:	Greater than 40 dB
Composite Triple Beat:	Less than minus 53 dB
Second Order:	Less than minus 60 dB
Terminal Isolation:	
Minimum TV-TV	25 dB
Minimum TV-FM	35 dB
Hum Modulation (maximum):	2 percent (equivalent to minus 40 dB sidebands)

1.5 DELIVERY AND STORAGE

Equipment shall be delivered in original packages with labels intact and identification clearly marked. Equipment and components shall be protected

from the weather, humidity and temperature variations, dirt and dust, or other contaminants.

1.6 ENVIRONMENTAL CONDITIONS

System components located inside buildings shall conform to the specified performance when subjected to any combination of the following environmental conditions:

Temperature: At 4 to 38 degrees C.

Relative humidity: From 0 to 100 percent (no water condensation).

PART 2 PRODUCTS

2.1 CABLE DISTRIBUTION PLANT

2.1.1 Coaxial Cable

Coaxial cable shall be used to connect headend equipment to the user interface. Allowable losses between components and user interface dictated by system design and construction considerations shall determine the size and type of coaxial cable.

2.1.1.1 Inside Plant Cables

All coaxial cables used for wiring within a building shall conform to NFPA 70. Inside plant cables less than 12.7 mm OD shall be PVC jacketed and shall have a braided copper or aluminum outer conductor with 65 plus or minus 5 percent braid coverage. The inner conductor shall be copper clad steel wire or solid copper and an aluminum foil bonded to the outside of the dielectric. The cable shall have a polyethylene foam dielectric unless used in plenum applications. Where cabling is to be placed in plenum, ducts and other air-handling spaces the cable shall meet NFPA 70.

2.1.1.2 Electrical Characteristics

The following types of cables are acceptable for use in the distribution system. The cables shall as a minimum conform to the following specifications:

a. Cables less than 12.7 mm OD:

Acceptable Type	Max Attenuation at 20 degrees C (db/30.5 m)				
	Frequency (MHz)				
	55	216	300	50	890
RG-6	1.05	3.05	3.55	4.40	6.51
RG-11	0.96	1.9	2.25	2.77	4.31

Characteristic:

Impedance 75 plus or minus 2 ohms

Capacitance: 0.0558 picofarads per mm

Velocity of Propagation: 81 plus or minus 3 percent

2.1.2 Distribution Amplifier

Distribution amplifiers shall be provided as required to deliver the minimum required signal parameters specified in paragraph SYSTEM DESCRIPTION and TABLE II to all user interfaces. All amplifiers shall be designed for heavy duty commercial and industrial applications.

2.1.2.1 Indoor Amplifiers

Indoor amplifiers shall be designed specifically for indoor usage. As a minimum, indoor amplifiers shall be contained in a wall-mountable, steel or aluminum housing, and vented or finned for convection cooling. The cable ports shall be stainless steel or brass threaded "F" type connectors for mechanically strong, corrosion resistant cable connections. External RF test points shall be provided to monitor signals without opening the housing. Indoor amplifiers may be powered through the cable or by a 110-125 Vac, 60 Hz source. A surge protection module shall be provided on cable entry ports. Cable powered amplifiers shall be capable of passing a maximum of 10 amperes through cable ports without damage. The individual components, amplifiers, filters, splitters, pads, equalizers and automatic level control circuitry shall be modular in construction and plug into the main RF chassis. All modular connections shall be made through rugged connections to withstand rough field handling.

2.1.3 Signal Splitter

The cable distribution system shall utilize signal power splitters, directional couplers, and isolation taps as required to meet the system performance requirements. Signal splitters shall have a power throughput capability of 6 amperes minimum when amplifiers are to be powered through the cable. All signal splitters shall be contained in rugged weatherproof anodized aluminum or other noncorrosive metal housing with brass connector ports. In addition to the above specifications, the splitters shall as a minimum conform to the following specifications:

Impedance:	75 ohms unbalanced
Return Loss:	17 dB
RFI Shielding:	100 dB
Isolation:	25 dB

2.1.4 Outlets

Outlets with plates shall be wall mounted and shall not protrude from the face of the wall more than 6.4 mm. Each outlet shall have an attenuation of less than 0.1 dB and a VSWR of less than 1.15 to 1. Cable Connectors shall be 75 ohm Type "F" self-terminating units. All metallic portions of

connectors shall be composed of anodized brass, beryllium copper or phosphorus bronze. Outlet connector shall be Type "F" female plug.

PART 3 EXECUTION

3.1 INSTALLATION

Interior installations shall comply with NFPA 70. Exterior installations shall comply with IEEE C2, NFPA 70, and NFPA 780. All system components shall be installed in accordance with the manufacturer's specifications and recommendations.

3.1.1 Distribution System

The Contractor shall configure the distribution system components in a manner consistent with the manufacturer's specifications. The distribution system design and placement shall conform to available cable routing and proposed equipment locations as shown on the facility layout drawings.

3.1.2 Components

Amplifiers, equalization circuitry, splitters, and power supplies shall be located with the cable, suitably waterproofed and protected with a metal enclosure when mounted outside or in a secured area on a wooden backboard for indoor installations.

3.2 GROUNDING

Grounding shall be in accordance with applicable portions of NFPA 70, NFPA 780, IEEE C2, UL 467 and EIA ANSI/EIA/TIA-222-F. The maximum resistance to ground at the connection point for all system components shall be 25 ohms. The grounding conductors shall be as a minimum No. 6 AWG solid copper. Existing towers, if utilized, shall be made to conform to the above requirements. All system components shall have a direct connection to ground. Each cable at the point of building entry shall be grounded with a grounding block or be equipped with a surge protector to dissipate electrical surges. Grounding blocks shall be directly connected to a ground. All headend equipment shall be equipped with surge protection either by inherent design or external device. Unless otherwise specified, lightning and transient surge protection shall be provided in accordance with NFPA 780.

3.3 FIELD TRAINING

The Contractor shall conduct training courses for operating and maintenance staff designated by the Contracting Officer. The training course will be given at the installation during normal working hours for a total of 4 hours for 2 persons and shall start after the system is functionally completed but prior to final acceptance tests. The field instructions shall cover all of the items contained in the approved operation and maintenance manuals, as well as demonstrations of routine maintenance operations. The Contracting Officer shall be notified at least 14 days prior to start of the training courses.

3.4 TESTING

The Contracting Officer shall be notified 30 days before systems are ready for acceptance tests. The acceptance tests shall not be conducted prior to the system having experienced 60 days of satisfactory operation, the last 20 days of which shall have been with no component failures. The acceptance tests shall be performed in accordance with the approved Test Plan and conform to NCTA-02 and conducted in the presence of the Contracting Officer. All instruments, personnel, and transportation required for the tests shall be provided by the Contractor.

3.4.1 Tests

Tests shall be performed on randomly selected equipment, components, and modules accepted by the Contracting Officer, to determine if the system meets the specified requirements. An end-to-end system test shall be coordinated to determine if the System Performance requirements have been met. Deficient portions of the system shall be repaired and retested at the Contractor's expense.

3.4.2 Cable Testing

After installation of the cable and before splicing in the system components, each cable section shall be tested using a time domain reflectometer (TDR) to determine shorts, open, kinks, and other impedance discontinuities and their locations. Cable sections showing adverse impedance discontinuities shall be replaced at the Contractor's expense. There shall be no cable splices between system components unless approved by the Contracting Officer.

-- End of Section --

TELEPHONE STATION REQUIREMENTS MATRIX (TSRS)

SERVICE CLASSES

MARK	SERVICE CLASS DESCRIPTION
AA	MEDICAL FACILITY, ON-INSTALLATION, LOCAL COMMERCIAL, DSN, AND LONG DISTANCE COMMERCIAL.
A	MEDICAL FACILITY, ON-INSTALLATION, LOCAL COMMERCIAL, AND DSN.
C	MEDICAL FACILITY, ON-INSTALLATION.
H	MEDICAL FACILITY.
P	COMMERCIAL PAY TELEPHONE.

TELEPHONE OUTLET SCHEDULE

MARK	DESCRIPTION
D	DESK
W	WALL
DC	DIRECT CONNECTION
P	PAY PHONE

TELEPHONE INSTRUMENT TYPES

MARK	INSTRUMENT DISCRIPTION
E	ELECTRONIC FEATURE PHONE SET
D	SINGLE LINE DESK/SET
ES	ELECTRONIC FEATURE PHONE SET W/SPEAKER/MICROPHONE
DS	SINGLE LINE DESK SET W/SPEAKER/MICROPHONE
W	SINGLE LINE WALL SET
WS	SINGLE LINE WALL SET W/SPEAKER/MICROPHONE
P	PAY PHONE, LOCAL TELEPHONE COMPANY WILL
S1	SPECIAL – SECURITY SYSTEM
S2	SPECIAL – VOICE DIALER FOR TEMPERATURE ALARMS
FX	FAX MACHINE

TELEPHONE FEATURE CHART

FEATURE	A	B	C	D	E	F	G	H	I	J	K	L	P
CALL TRANSFER/ CONSULTATION HOLD/ 3 PARTY CONFERENCE	X	X	X	X	X	X	X	X	X	X	X		
CAMP-ON	X	X	X	X	X	X	X	X	X	X	X	X	
PROGRESSIVE CONFERENCE	X	X	X	X	X	X		X					
ABBREVIATED DIAL	X	X		X	X	X							
EXECUTIVE BRIDGING	X	X											
DO NOT DISTURB	X		X			X		X		X			
CALL FORWARDING	X		X			X					X		
RADIO PAGING SYSTEM	X	X	X	X	X	X	X	X	X	X	X	X	
VOICE MAIL	X	X	X			X							
PUBLIC ADDRESS SYSTEM	X	X					X						
CENTRAL DICTATION	X	X	X	X		X		X					
CODE BLUE	X	X	X	X	X	X	X	X	X	X	X	X	
PUBLIC PHONE													X

STATION INSTRUMENT COUNT (BY TYPE)

INSTRUMENT TYPE:	COUNT
DESK (D)	24
WALL (W)	17
DESK WITH SPEAKER (ED)	4
WALL WITH SPEAKER (WS)	1

LINE/PORT CAPACITY CALCULATIONS

ITEM	CALCULATION METHOD	CALCULATED RESULT	SUPPLIED
INITIALLY INSTALLED CAPACITY (IIC)	TOTAL TSRS PORT COUNT * 1.15 = IIC	$52 * 1.15 = 59.8$	150
FULLY WIRED CAPACITY (FWC)	$IIC * 1.40 = FWC$	$59.8 * 1.40 = 83.7$	150
MAXIMUM OPERATIONAL CAPACITY (MOC)	$IIC * 2.0 = MOC$	$59.8 * 2.0 = 119.6$	150

ROOM NUMBERS	AREA	INTRADEPART INTERCOM	OUTLET NUMBER & TYPE	INSTRUMENT NUMBER & TYPE	FEATURES	NO. LINES & SERVICE CLASS	NOTES
002	CLINIC LOBBY		0				
006	FAMILY PRACTICE WAIT		1-D	1-D	L	H	
005	PHARM WAIT		2P, 1W	2P, 1W	L	H	
007	SATELLITE PHARM.		4-D, 1-DC	1-D, 1-S1	L	H	
008	X-RAY		1-W	1-W	I	H	
009	RECEPTION		2-D	1-ED	G	A/C	
010	X-RAY QC/DEV		2-D	1-D	I	A	
011	BLOOD DRAW		0				
012	ADMIN.		2-D	1-ED	F	AA/A	
013	SPEC/STAT LAB		2-D	1-D	L	H	
014	BEE/PH OFFICE		2-D	1-D	C	A	
015	ECG/PULM TEST		1-W	1-W	C	A	
016	EYE EXAM TEST		2-D	1-D	C	A	
017	AUDIOBOOTH		2-D	1-D	L	H	
018	OIC OFFICE		2-D	1-ED	A	AA/A	
019	LOUNGE		1-W	1-W	L	C	
020	COMPUTER ROOM		2-D, 1-W	1-W	L	H	
022	COMM CLO.		1-W	1-W, 1-S2	L	H	
023B	BIO. MED. WK. STATN.		1-D, 1-W	1-W	L	H	
021	ELEC CLO.		1-W	0			
023	GEN STO.		1-W	0			
023A	HK. EQ. / SUP. STOR.		1-W	0			
024	PROVIDER CUBICAL		4-D	4-D	C	A	
025	CONF. / TRAINING		2-W, 2-D	1-WS	I	H	
026	MALE LOCKERS		0	0			
027	FEMALE LOCKERS		0	0			
030	EXAM RM		2-D	1-D	C	A	
031	S. UTIL./TRASH		1-W	0			
032	EXAM RM		2-D	1-D	C	A	
033	TREATMENT RM		1-W, 1-D	1-W	H	H	
034	EXAM RM		2-D	1-D	C	A	
035	STORAGE MED. RECORDS		1-D	1-D			
036	EXAM RM		2-D	1-D	C	A	
037	HOT DESK COPIER/DISTR.		2-D	1-D, 1-FX			
038	EXAM RM		2-D	1-D	C	A	
039	W&M/SCREENING		1-D	1-D	L	H	
040	EXAM RM		2-D	1-D	C	A	
041	CLEAN UTL		1-W	0			
043	DENTAL WAIT		1-W	1-W	L	H	

ROOM NUMBERS	AREA	INTRADEPART INTERCOM	OUTLET NUMBER & TYPE	INSTRUMENT NUMBER & TYPE	FEATURES	NO. LINES & SERVICE CLASS	NOTES
042	RECEPT. / DENTIAL RECORDS		2-D	1-ED	G	A/C	
044A	X-RAY ALCOVE		1-W	1-W	I	H	
044	X-RAY RM		0				
045	ORAL HYG. DTR						
046	DEVELOPING		1-W	1-W	I	A	
047	ORAL HYG. DTR		1-W	1-W	I	H	
048	PROF. WORKAREA		1-D, 1-W	1-W	C	A	
049	GEN. DTR		1-W	1-W	I	H	
050	ADMIN OFF		4-D	3-D	F	AA/A	
051	GEN. DTR		1-W	1-W	I	H	
052	CENTRAL ISSUE		1-D	1-D	I	H	
053	GEN. DTR		1-W	1-W	I	H	
054	DIPC		1-W	1-W	I	H	
055	ELEC.		1-W	0			
058	MECH		1-W	0			

NOTES:

1. BLOOD ALARM VOICE DIALER

2000-022
3-9-01

ATTACHMENT NO. 5

ENGINEERING TECHNICAL LETTERS (ETL)

The following Engineering Technical Letters are attached:

ETL 94-2	UTILITY METERS IN NEW AND RENOVATED FACILITIES
ETL 99-4	FIRE PROTECTION ENGINEERING CRITERIA AND TECHNICAL GUIDANCE - EMERGENCY LIGHTING AND MARKING OF EXITS

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE CIVIL ENGINEERING SUPPORT AGENCY

10 JUN 1994

FROM: HQ AFCEA/ENM
139 Barnes Drive Suite 1
Tyndall AFB FL 32403-5319

SUBJECT: Engineering Technical Letter (ETL) 94-2:
Utility Meters in New and Renovated Facilities

1. Purpose. This ETL establishes a mandatory requirement for utility meters in new and renovated base facilities to measure consumption of supplied water, fuel, or energy. These meters measure energy and water used by general purpose (process) buildings, and utilities services reimbursable or refundable by the government or private business. Use of meters will:

- o Establish benchmarks of current energy consumption to help the Base
- o Energy Conservation Committee manage facility energy consumption;
- o Identify high energy and water consumers to help base personnel reduce consumption;
- o Enhance safety of fuel hydrant systems; and
- o Allow response to frequent Congressional inquiries regarding the effectiveness of energy and water analyses through metering.

2. Application.

2.1. Authority. The Code of Federal Regulations (10 CFR 435, Sect 10, Energy Management) and the Energy Policy Act of 1992 (Public Law 102-486, Sect 305), require metering of each distinct utility-provided energy service. This ETL also satisfies requirements of Office of the Secretary of Defense (OSD) Defense Energy Program Policy Memorandum (DEPPM) 92-2, Energy Conservation Investment Program Guidance, 4 March 1992, to validate energy savings.

2.2. Effective Date. This ETL supersedes ETL 87-5, Utility Meters in New and Renovated Facilities, 13 July 1987, and is effective immediately.

3. Specific Requirements. Install meters at all new facilities and each major renovation project. Install additional meters as required to satisfy local environmental monitoring laws. Provide a meter for each energy utility serving the building (steam, high-temperature hot water, electricity, natural gas, fuel oil). Meters will be calibrated in the normal units of the utility [MJ (kWh), L (cf or gal)]. If one form of energy is used to produce a second form (such as natural gas producing steam) used solely within that facility, meter only the primary source at the building boundary.

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NOTE: These meters are for government use only for monitoring and evaluating energy consumption within a facility. They are NOT for utility company billing usage!

3.1. Electric Metering. Measure energy consumed by:

- o Electrical lighting;
- o Miscellaneous power outlets;
- o HVAC systems and equipment;
- o Service hot water; and
- o Process loads

for buildings where combined service exceeds 150 kVA or fuel use exceeds 146,536 W (500,000 Btu/h). Meter the following individually where system consumption exceeds 100 kVA or 87,921 W (300,000 Btu/h):

- o Production processes (manufacturing, computers, laundries, kitchens);
- o Auxiliary systems and service water heating;
- o Space heating (including reheat);
- o Space cooling; and
- o HVAC delivery systems.

Exception: When there is an energy service for only two of the six categories listed, take a single measurement for the larger service, and determine consumption of the smaller service by subtracting the larger service measurement from the primary service measurements.

3.2. Water Metering. Measure water consumption for:

- o All non-appropriated funded facilities which reimburse the government for water usage.
- o All facilities with a boiler plant 879.21 kW (3 MBtu/h) capacity or larger.
- o Facilities that use more than 18,927 liters (5000 gallons) of water per day, including landscape irrigation. These facilities should be addressed on a case-by-case basis and specified in the project definition when this requirement applies.

3.3. Types of Meters.

3.3.1. Watt-hour Meters.

3.3.1.1. Without Demand Registers. Watt-hour meters and sockets must comply with ANSI C12.10 and have pulse initiators for remote monitoring of watt-hour consumption. The pulse initiator will consist of Form C contacts with:

- o Current rating not to exceed 2 amperes (A);
- o Voltage not to exceed 500 volts (V);

- o Volt-amperes (VA) not to exceed 1 00 VA; and
- o Life rating of one billion operations.

3.3.1.2. With Demand Registers. Meters and sockets must comply with ANSI C12.10 and have pulse initiators for remote monitoring of watt-hour consumption and instantaneous demand. Pulse initiators will be as described in paragraph 3.3.1.1.

3.3.2. Water Meters. Meters must conform to American Water Works Association (AWWA) C700 and meet these criteria:

- o positive displacement, oscillating piston, or oscillating disc type;
- o magnetic drive with magnetic shielding;
- o straight reading sealed register graduated in liters (cubic feet);
- o all bronze split case;
- o integral strainer;
- o threaded ends;
- o with pulse switch initiator.

Water meters must be capable of accurately measuring and handling water at pressure, temperatures, and-flow rates encountered. The pulse initiator will provide the maximum number of pulses, up to 500 per minute, obtainable from the manufacturer; and not less than 1 pulse per 378.5 liters (100 gallons).

3.3.3. Gas Meters. Install meters according to 49 CFR 192, Transportation of Natural or Other Gas by Pipeline: Minimum Federal Safety Standards and the Guidance Manual for Operations of Small Gas Systems, U.S. Department of Transportation. Gas meters must conform to the American Gas Association (AGA) standard appropriate for the size and type meter installed. Meters must be capable of providing pulse or digital signals for remote readout. Pulse switch initiators will provide the maximum number of pulses, up to 500 per minute, obtainable from the manufacturer; and not less than 1 pulse per 2.83 cubic meters (100 cubic feet). Meters will have local readout capability and be calibrated in standard cubic meters (cubic feet).

3.3.4. Steam Condensate Meters. Meters must conform to MIL-M-1 8294, Style A or C, size 1. Meters will be designed for 121.1 degrees Celsius (250 degrees Fahrenheit) condensate, and flow rates from 7.6 to 37.8 liters (2 to 10 gallons) per minute. Meters will have a pulse switch initiator capable of 500 pulses per minute with no false pulses; and not less than 1 pulse per 37.8 liters. Meters will not require field adjustments.

3.3.5. Chilled Water Meters. If the facility receives chilled water from a central chilled water plant, install a watt ("Btu") meter. This is a commercially available meter which senses flow and temperature differential and automatically calculates and records watts. Meters must be capable of being read locally and by the base Energy Management and Control System (EMCS).

3.3.6. High-Temperature Water (HTW) Meters. If the facility is supplied HTW from a central plant, install a watt meter. This meter is similar to the chilled water meter, but suitable for the temperature and pressures incurred with HTW. Meters must be capable of being read locally and by the base EMCS.

3.3.7. Fuel Flow Meters. Refer to AFM 85-16, Maintenance of Petroleum Systems and NAVFAC DM 22, Petroleum Fuel Facilities.

3.3.8. Water and Wastewater Treatment Plant and Well Meters. Install meters for all plants and wells. Install flow-rate recording and totalizing meters in all plants treating more than 189,271 liters per day (0.05 MGD). Install totalizing meters in smaller plants. Components will meet these criteria:

- o Parshall flume - reinforced concrete with aluminum or reinforced fiberglass liner;
- o Nozzles - cast iron;
- o Weirs - brass alloy;
- o Magnetic - standard manufacturers product;
- o Control panel - standard manufacturers product (recording, indicating, and totalizing).

For wastewater treatment plant meters, refer to NAVFACENGCOM Guide Spec NFGS-13321, Flow Measuring Equipment (Potable Water) (Sewage Treatment Plant), 2 October 1985.

3.3.9. Heating Plant Meters- Provide the following instruments, meters, and auxiliaries:

3.3.9.1. Temperature Recorders: One for each high-temperature water boiler and each district heating circuit. Include meters on supply and return systems.

3.3.9.2. Recording and Integrating Flowmeters in Kilopascals (Pounds: One for each high-temperature water boiler and each district heating circuit.

3.3.9.3. Steam-Flow Meters: One recording and integrating type meter for each boiler using 87.9 kW (0.3 MBtu/h) or larger; or on a main header for a group of small boilers totaling 146.5 kW (0.5 MBtu/h) or more that allows recording pressure. Meters must be capable of being read locally and by the base EMCS. Turbine-type steam meters are not recommended. Refer to ANSI MFC-4M-86, Measurement of Gas Flow by Turbine Meters (R1990); MFC-5M-85, Measurement of Liquid Flow in Closed Conduits Using Transit-Time Ultrasonic Flowmeters; MFC-6M-87, Measurement of Fluid Flow in Pipes Using Vortex Flowmeters; MFC-11M-89, Measurement of Fluid Flow by Means of Coriolis Mass Flowmeters; and ASME PTC 19.5-72, Application Part II of Fluid Meters, sixth edition, 1971.

3.3.9.4. KWh (MBtu/h) Feedwater Meters: One for each high pressure boiler

plant 146.5 kW or larger not equipped with steam-flow meters.

3.3.9.5. CO₂, O₂, and Boiler Exit Temperature Recorders: One CO₂ or O₂ recording meter for each boiler 2931 to 13,188 kW (10 to 45 MBtu/h) output capacity. Provide boiler exit temperature on all boilers over 2931 kW.

3.3.10. Chilled Water Plant Meters. Install a temperature recorder at each plant. Provide flow recorders for constant and variable speed pumps, one for each chiller and each district chilled water circuit. Install meters on both supply and returns.

3.3.11. Make-Up Water Meters: One for each high-pressure steam and high-temperature water boiler plant.

3.3.12. Gas and Oil Meters: One for each boiler or direct-fired hot air furnace plant 879 kW (3 MBtu/h) or larger.

3.3.13. Temperature and Pressure Recorders: One for each feed water heater.

4. Definitions. New and renovated facilities include facilities which have not reached the 10 percent design stage as of the date of this letter. For this ETL, renovated facilities feature changes in the building envelope, replacement of lighting, HVAC, or water heating systems.

5. Point of Contact. Mr Freddie L. Beason, PE, HQ AFCESA/ENM, DSN 523-6361, commercial (904) 283-6361, FAX 523-6219.

DENNIS M FIRMAN, PE
Director, Systems Engineering

3 Atch
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2. ETL Index

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ENGINEERING TECHNICAL LETTERS (ETL)

SECTION A - CURRENT ETLs

ETL Number	Title	Date Issued
82-2	Energy Efficient Equipment	10 Nov 82
83-1	Design of Control Systems for HVAC	16 Feb 83
	Change No. 1 ETL 83-1, U. S. Air Force	
	Standardized Heating, Ventilating & Air	
	Conditioning (HVAC) Control Systems	22 Jul 87
83-3	Interior Wiring Systems, AFM 88-15 Para 7-3	2 Mar 83
83-4	EMCS Data Transmission Media (DTM) Considerations	3 Apr 83
83-7	Plumbing, AFM 88-8, Chapter 4	30 Aug 83
83-8	Use of Air-to-Air Unitary Heat Pumps	15 Sep 83
83-9	Insulation	14 Nov 83
84-2	Computer Energy Analysis	27 Mar 84
	Change 1 Ref: HQ USAF/LEEEU Msg	
	031600Z MAY 84	1 Jun 84
84-7	MCP Energy Conservation Investment Program (ECIP)	13 Jun 84
84-10	Air Force Building Construction and	
	the Use of Termiticides	1 Aug 84
86-2	Energy Management and Control Systems (EMCS)	5 Feb 86
86-4	Paints and Protective Coatings	12 May 86
86-5	Fuels Use Criteria for Air Force Construction	22 May 86
86-8	Aqueous Film Forming Foam Waste Discharge Retention	
	and Disposal	4 Jun 86
86-9	Lodging Facility Design Guide	4 Jun 86
86-10	Antiterrorism Planning and Design Guidance	13 Jun 86
86-14	Solar Applications	15 Oct 86
86-16	Direct Digital Control Heating	
	Ventilation and Air Conditioning Systems	9 Dec 86
87-1	Lead Ban Requirements of Drinking Water	15 Jan 87
87-2	Volatile Organic Compounds	4 Mar 87
87-4	Energy Budget Figures (EBFS) for Facilities	
	in the Military Construction Program	13 Mar 87
87-9	Prewiring	21 Oct 87
88-2	Photovoltaic Applications	21 Jan 88
88-3	Design Standards for Critical Facilities	15 Jun 88
88-4	Reliability & Maintainability (R&M)	
	Design Checklist	24 Jun 88
88-6	Heat Distribution Systems Outside of Buildings	1 Aug 88
88-9	Radon Reduction in New Facility Construction	7 Oct 88
88-10	Prewired Workstations Guide Specification	29 Dec 88

ENGINEERING TECHNICAL LETTERS (ETL)

SECTION A - CURRENT ETLs

ETL Number	Title	Date Issued
89-2	Standard Guidelines for Submission of Facility Operating and Maintenance Manuals	23 May 89
89-3	Facility Fire Protection Criteria for Electronic Equipment Installations	9 Jun 89
89-4	Systems Furniture Guide Specification	6 Jul 89
89-6	Power Conditioning and Continuation Interfacing Equipment (PCCIE) in the Military Construction Program (MCP)	7 Sep 89
89-7	Design of Air Force Courtrooms	29 Sep 89
90-1	Built-Up Roof (BUR) Repair/Replacement Guide Specification	23 Jan 90
90-2	General Policy for Prewired Workstations and Systems Furniture	26 Jan 90
90-3	TEMPEST Protection for Facilities Change 1 Ref: HQ USAF/LEEDE Ltr dated 20 April 90, Same Subject	23 Mar 90
90-4	1990 Energy Prices and Discount Factors for Life-Cycle Cost Analysis	24 May 90
90-5	Fuel and Lube Oil Bulk Storage Capacity for Emergency Generators	26 Jul 90
90-6	Electrical System Grounding, Static Grounding and Lightning Protection	3 Oct 90
90-7	Air Force Interior Design Policy	12 Oct 90
90-8	Guide Specifications for Ethylene Propylene Diene Monomer (EPDM) Roofing	17 Oct 90
90-9	Fire Protection Engineering Criteria for Aircraft Maintenance, Servicing, and Storage Facilities	2 Nov 90
90-10	Commissioning of Heating, Ventilating, and Air Conditioning (HVAC) Systems Guide Specification	17 Oct 90
91-1	Fire Protection Engineering Criteria Testing Halon Fire Suppression Systems	2 Jan 91
91-2	High Altitude Electromagnetic Pulse (HEMP) Hardening in Facilities	4 Mar 91
91-4	Site Selection Criteria for Fire Protection Training Areas	14 Jun 91
91-5	Fire Protection Engineering Criteria - Emergency Lighting and Marking of Exits	18 Jun 91
91-6	Cathodic Protection	3 Jul 91

ENGINEERING TECHNICAL LETTERS (ETL)

SECTION A - CURRENT ETLs

ETL Number	Title	Date Issued
91-7	Chlorofluorocarbon (CFC) Limitation in Heating, Ventilating and Air-Conditioning (HVAC) Systems	21 Aug 91
93-1	Construction Signs	11 Mar 93
93-2	Dormitory Criteria for Humid Areas	13 Jul 93
93-3	Inventory, Screening, Prioritization, and Evaluation of Existing Buildings for Seismic Risk	18 Aug 93
93-4	Fire Protection Engineering Criteria - Automatic Sprinkler Systems in Military Family Housing (MFH)	11 Aug 93
93-5	Fire Protection Engineering Criteria - Electronic Equipment Installations	22 Dec 93
94-1	Standard Airfield Pavement Marking Schemes	5 Apr 94
94-2	Utility Meters in New and Renovated Facilities	10 Jun 94

SECTION B - OBSOLETE ETLs

No.	Date	Status
82-1	10 Nov 82	Superseded by ETL 83-10, 86-1, 87-4
82-3	10 Nov 82	Superseded by ETL 83-5, 84-2
82-4	10 Nov 82	Superseded by ETL 84-7
82-5	10 Nov 82	Superseded by ETL 84-1, 86-13, 86-14
82-6	30 Dec 82	Cancel led
82-7	30 Nov 82	Cancel led
83-2	16 Feb 83	Superseded by ETL 84-3
83-5	5 May 83	Superseded by ETL 84-2
83-6	24 May 83	Cancel led
83-10	28 Nov 83	Superseded by ETL 86-1
84-1	18 Jan 84	Superseded by ETL 86-14
84-3	21 Mar 84	Cancel led
84-4	10 Apr 84	Superseded by ETL 86-7, 86-15, 87-5
84-5	7 May 84	Superseded by ETL 84-8, 86-11, 86-18, 88-6
84-6	Not Issued	Cancel led/Not Used
84-8	19 Jun 84	Superseded by ETL 86-11
84-9	5 Jul 84	Superseded by ETL 88-7
88-5	2 Aug 88	Superseded by ETL 91-6
86-1	3 Feb 86	Superseded by ETL 87-7
86-3	21 Feb 86	Superseded by ETL 86-4
86-6	3 Jun 86	Superseded by ETL 86-11, 86-18, 88-6
86-7	3 Jun 86	Superseded by ETL 86-15
86-11	3 Jul 86	Superseded by ETL 88-6
86-12	3 Jul 86	Superseded by ETL 90-2
86-13	18 Aug 86	Superseded by ETL 86-14
86-15	13 Nov 86	Superseded by ETL 87-5
86-17	17 Dec 86	Superseded by ETL 89-6
86-18	18 Dec 86	Superseded by ETL 88-6
87-3	12 Mar 87	Superseded by ETL 87-6, ETL 88-6
87-5	13 Jul 87	Superseded by ETL 94-2
87-6	21 Aug 87	Superseded by ETL 88-5
87-7	14 Oct 87	Superseded by ETL 89-1
87-8	19 Oct 87	Superseded by ETL 90-1
88-1	5 Jan 88	Superseded by ETL 89-2
88-5	2 Aug 88	Superseded by ETL 91-6
88-7	24 Aug 88	Superseded by ETL 90-3, ETL 91-2
88-8	4 Oct 88	Superseded by ETL 91-7
89-1	6 Feb 89	Superseded by ETL 90-4
89-5		Issued as ETL 90-7
91-8	24 Sep 91	Cancel ed
91-3	14 Jun 91	Superseded by MIL HDBK 1008B, Jan 94



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE CIVIL ENGINEER SUPPORT AGENCY

NOV 9 1999

FROM: HQ AFCESA/CES
139 Barnes Drive
Tyndall AFB FL 32403-5319

SUBJECT: **Engineering Technical Letter (ETL) 99-4: Fire Protection Engineering Criteria and Technical Guidance - Emergency Lighting and Marking of Exits**

1. Purpose. This ETL provides criteria for emergency lighting and the marking methods for means of egress. Use this ETL together with guidance in MIL-HDBK 1008C.

2. Summary of Revisions. This ETL supersedes ETL 94-5, 3 Nov 1994, and incorporates the new requirements of the 1997 edition of NFPA 101, *The Life Safety Code*. It requires elimination of all radioluminous exit signs from the Air Force inventory (paragraph 6.2.2); expands recordkeeping requirements for radioluminous signs to include removal date, method of disposal, and disposition (paragraph 6.2.2.1.1); and updates references.

3. Application. Requirements of this ETL are mandatory for all new projects and all existing facilities on Air Force installations. Projects awarded for construction prior to the date of this ETL but not accepted into the Air Force inventory may be classified as existing facilities by the MAJCOM fire protection engineer.

Note: Use of "shall" indicates a mandatory requirement. "May" or "should" indicates a nonmandatory action or condition.

3.1. Authority. Air Force Instruction 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*.

3.2. Effective Date: Immediately.

3.3. Expiration: Expires five years from date of issue.

3.4. Ultimate Recipients:

- MAJCOM Civil Engineering and Fire Protection offices; medical communities.
- Base Civil Engineering and Fire Protection offices; radiation safety officer.
- Responsible Army Corps of Engineers (USACE) and Naval Facilities Engineering Command (NAVFACENGCOM) offices acting as design/construction agents for Air Force projects or facilities on Air Force property.

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3.5. Coordination:

- MAJCOM Civil Engineering and Fire Protection offices; Surgeons General

4. Referenced Publications.

4.1. Public Law:

- 49 CFR 173, Subpart I, *Class 7 (Radioactive) Materials*

Note: Prior to implementing this ETL, thoroughly review applicable revisions to publications listed in paragraphs 4.1, 4.2, and 4.3.

4.2. Department of Defense (DoD):

- MIL-HDBK 1008C, *Fire Protection for Facilities Engineering, Design, and Construction*
- AFI 40-201, *Managing Radioactive Materials in the USAF*

4.3. National Fire Protection Association(NFPA):

- NFPA 101, *The Life Safety Code*, current edition
- NFPA 110, *Emergency and Standby Power Systems*, 1999

4.4. Private Industry:

- National Institute of Safety Technology Research (NISTR) 4399, *Evaluation of Exit Signs in Clear and Smoke Conditions*, August 1990
- Interstate Commerce Commission/American National Standards Institute (ICC/ANSI) A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*, 1998

5. Definitions.

5.1. Accessible: Easily entered or vacated by a physically disabled person.

5.2. Accessible Area of Refuge: An area of refuge complying with the accessible route requirements of ICC/ANSI A117.1.

5.3. ADA: Americans with Disabilities Act.

5.4. Area of Refuge: Either:

- A floor of a fully sprinklered building that has at least two accessible rooms or spaces separated from each other by smoke partitioning;

OR

- A space in a means of egress that is protected from the effects of fire and smoke, either by separation from the other spaces in the same building or by virtue of location, thereby permitting delay in egress travel from any level.

5.5. *Emergency Lighting System:* A system capable of providing minimum required illumination (average of 1 foot-candle or 10 lux) for the means of egress. It includes the lighting units, related backup power source(s), and required connections.

5.6. *Existing Facilities:* For this ETL, a facility is existing if changes to be made are cosmetic only.

5.7. *Exit Sign:* For this ETL, exit sign refers to internally illuminated exit signs only.

5.8. *Horizontal Exit:* Either:

- A passage from one building to an area of refuge and access to a means of egress (complying with NFPA 101) in another building on approximately the same level;
- A passage through or around a fire barrier (2-hour minimum) to an area of refuge with access to a means of egress (complying with NFPA 101) on approximately the same level in the same building, that affords safety from fire and smoke originating from the area of incidence and communicating areas.

5.9. *IAW:* in accordance with.

5.10. *LED:* light emitting diode.

5.11. *Listed:* Applies to equipment or materials included in a list published by an organization acceptable to the authority with jurisdiction. The organization periodically inspects production and certifies that the items meet appropriate standards or test as suitable for a specific use.

5.12. *New Construction:* For application of this ETL, a facility is new if changes to be made are more than cosmetic, such as major renovations and/or additions, or new facilities.

5.13. *NISTR:* National Institute of Safety Technology Research

5.14. *NRC:* Nuclear Regulatory Commission.

5.15. *RSO:* Radiation Safety Officer.

5.16. *Tactile Signs:* Signs perceptible by touch which provide critical egress information to the sight-impaired.

5.17. *Tested:* Materials, equipment, or systems tested by a nationally recognized testing laboratory for compliance with nationally recognized tests approved for use by the Air Force.

6. *Specific Requirements.* Emergency lighting and marking of exits are integral components of the total life safety package for any given facility, yet frequently

overused and misused. No single sign type or emergency lighting package meets all Air Force requirements. The following provides guidance for selecting equipment most appropriate for particular applications, and incorporates new NFPA 101 changes.

6.1. Emergency Lighting System. Provide emergency lighting system IAW NFPA 101, 5-9. Usually, emergency lighting is required only for designated stairs, aisles, corridors, ramps, escalators and passageways leading to an exit. Interior and/or windowless rooms which are not normally occupied (such as mechanical rooms, toilets, and telephone equipment rooms) generally do not require emergency lighting unless they qualify as an underground structure and/or a windowless structure as defined in NFPA 101, 32-7.

6.1.1. Acceptable Emergency Lighting Systems:

- Fixtures connected to a permanently installed facility electrical generator system. Install, test, and maintain these generators IAW NFPA 110.
- Fixtures with internal battery packs that are part of a drop-in light system.
- Fixtures with remote battery packs.

6.1.2. Prohibited Emergency Lighting Systems.

6.1.2.1. New Construction. Do not use fixtures with wall-mounted battery packs.

6.1.2.2. Existing Construction. Remove existing fixtures equipped with wall-mounted battery packs where such fixtures are not required by NFPA 101 or DoD regulations.

Note: Do not remove fixtures simply to eliminate wall-mounted battery packs where:

- emergency lighting is required IAW NFPA 101;
and
- fixtures meet minimum NFPA 101 requirements.

6.2. Marking of Exits.

6.2.1. Acceptable Exit Signs.

6.2.1.1. LED. Use LED exit signs with illuminated letters displayed on an opaque background.

6.2.1.1.1. Lettering on all exit signs for an installation shall be one uniform color. Each base shall establish either red or green as the standard lettering color. Installations in or near jurisdictions with established exit sign lettering colors should adopt similar red or green standards. Do not replace existing exit signs meeting minimum NFPA 101 standards simply to standardize sign colors. When signs must be replaced for other reasons, use the installation color.

6.2.1.1.2. Installations overseas may use different colors, pictorials, and/or bilingual lettering as necessary to comply with local national standards. All exit signs must be

immediately obvious as an exit marking to a recently transferred or visiting U.S. citizen, or accompanied by a marking complying with NFPA 101, 5-10. At a minimum, locate exit markings IAW NFPA 101, 5-10; additional markings are permitted to comply with host nation standards. The overseas theatre MAJCOM fire protection engineer shall publish a formal standardized policy to implement variations from NFPA 101 and this ETL.

6.2.1.1.3. If an area of refuge or accessible area of refuge requires an illuminated exit sign, identify the area with an illuminated LED sign stating "AREA OF REFUGE" and displaying the international pictograph for accessibility IAW with ICC/ANSI 117.1, *American National Standard for Accessible and Usable Buildings and Facilities*.

6.2.2. Prohibited Exit Signs.

6.2.2.1. Radioluminous. AFI 40-201, *Managing Radioactive Materials in the USAF*, discourages use of these signs. These signs, new or existing, have been prohibited on Air Force installations since June of 1996. Previously, ETL 94-5 (superseded by this ETL) required their removal (where installation is not in a code-required location) or replacement (where installed in a code-required location) with LED exit signs. Radioluminous signs contain radioactive tritium gas, which is controlled by the Nuclear Regulatory Commission (NRC). Special handling is required for transportation and disposal, IAW 49 CFR 173, Subpart I, *Class 7 (Radioactive) Materials*.

6.2.2.1.1. Records. The facility owner (base real estate office), base fire department, and base bioenvironmental engineering office shall maintain records of the exact location, manufacturer, installation and removal dates, disposal agent and disposition of each remaining sign.

6.2.2.1.2. Undamaged Signs. Return undamaged signs removed from service to the manufacturer for disposal. Some manufacturers will accept any manufacturer's signs, usually for a nominal fee. Follow transportation requirements IAW 49 CFR 173 Subpart I when returning signs. If return to a manufacturer is not possible, dispose of signs as radioactive waste. Contact San Antonio Air Logistics Center (SA-ALC/EMP), 307 Tinker Drive Suite 1 (Bldg 306), Kelly AFB TX 78241-5917, for instructions.

6.2.2.1.3. Damaged Signs. Treat damaged signs as a potential radioactive materials incident and report them immediately through the base radiation safety officer (RSO) to the Radioisotope Committee. The base RSO will direct actions necessary for health and safety.

6.2.2.2. Incandescent. Do not use signs lit by incandescent bulbs in new construction. Existing incandescent signs may remain in service. When replacement is dictated by maintenance or construction requirements, replace the signs with LED exit signs, or refit them with LED conversion units.

6.2.3. Locating Illuminated Exit Signs. Do not install exit signs on main entrance/exit doors that are clearly identifiable as exits. Do not install exit signs on other exit doors immediately obvious as exits, with the exception of assembly and mercantile occupancies. A common-sense approach is essential to proper marking of the means of egress.

Note: NFPA 101 requires floor proximity signs for certain occupancies. Refer to NFPA 101, 5-10.1.5 for specific requirements.

6.2.4. Tactile Signage.

6.2.4.1. Exits. Tactile signs are required at each door to a stair enclosure and at each exit (including horizontal exits) IAW ADA, NFPA 101, 5-10 and ICC/ANSI A117.1. Signs shall have raised or recessed lettering and pictographs (where applicable) in contrasting colors. The sign content shall be in Braille. Locate tactile signs on the latch side of the door, centered at 1524 millimeters (60 inches) above the finished floor.

Note: ADA signage requirements include more than just marking of exits and are mandatory for both new and existing facilities.

6.2.4.2. Areas of Refuge. Tactile signs displaying "AREA OF REFUGE" and the international pictograph for accessibility are also required to identify areas of refuge and accessible areas of refuge IAW ICC/ANSI A117.1.

6.2.4.3. Stair Enclosures. Use tactile signs to identify:

- the floor level;
 - the terminuses at the top and the bottom of the stair enclosure;
 - the floor level of and direction to the exit discharge;
- and to present other identifying information (such as "East" or "West").

7. Point of Contact: Ms. Erin A.M. Oneisom, HQ AFCESA/CESM, DSN 523-6329, commercial (850) 283-6329, FAX 523-6219, or internet erin.oneisom@tyndall.af.mil.

Michael J. Cook, Colonel, USAF
Director of Technical Support

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Department of Defense Antiterrorism Construction Standards

XX, 2001

*Supersedes 16 December 1999 Interim Department of Defense Antiterrorism /
Force Protection Construction Standards*

The Under Secretary of Defense (Acquisition, Technology, and Logistics)

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FOREWORD

This document is issued under the authority of DoD Instruction Number 2000.16, "DoD Combating Terrorism Program Standards," which requires DoD Components to adopt and adhere to common criteria and minimum construction standards to mitigate antiterrorism vulnerabilities and terrorist threats.

This document applies to the Office of the Secretary of Defense (OSD); the Military Departments (including their National Guard and Reserve Components); the Chairman, Joint Chiefs of Staff and Joint Staff; the Combatant Commands; the Office of the Inspector General of the Department of Defense; the Defense Agencies; the Department of Defense Field Activities; and all other organizational entities within the Department of Defense (hereafter referred to collectively as "the DoD Components").

The standards established by this document are minimums set for DoD. Each DoD Component may set more stringent antiterrorism construction standards to meet the specific threats in their areas of responsibility.

This document is effective immediately and is mandatory for use by all the DoD Components.

This document supersedes "Interim Department of Defense Antiterrorism/Force Protection Construction Standards," 16 December 1999, except that the Interim Standards will remain in effect for the Fiscal Year 2002 and 2003 Military Construction programs.

Users in the field are highly encouraged to submit comments on this document. Send recommended changes to:

Deputy Under Secretary of Defense (Installations and Environment)
3400 Defense Pentagon
Washington, DC 20301-3400

These comments should address content (accuracy, usefulness, consistency, and organization), writing, and appearance.

The DoD Components may obtain copies of this document through the U.S. Army Engineer District, Omaha, ATTN: CENWO-ED-ST, 12565 West Center Road, Omaha, NE 68144-3869. Other Federal Agencies may obtain copies from Department of the Army, U.S. Army Corps of Engineers, ATTN: CECW-EI, Washington, DC 20314-1000. Information in this document is exempt from mandatory public disclosure under provisions of FOIA, para. 5 USC 552(b)(2). Distribution of this document is restricted to U.S. Government agencies and their contractors only.

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REFERENCES

- (a) Department of Defense Interim Antiterrorism / Force Protection Construction Standards, December 16, 1999 (hereby cancelled).
- (b) DoD Instruction 2000.16, DoD Antiterrorism Standards, June 14, 2001.
- (c) DoD Handbook 2000.12-H, Protection Of DoD Personnel and Activities Against Acts of Terrorism and Political Turbulence, February 1993.
- (d) American Society of Civil Engineers Standard (ANSI/ASCE) 7-98, Minimum Design Loads for Buildings and Other Structures, January 2000.
- (e) Unified Facility Criteria (UFC) 4-010-01. DoD Security Engineering Manual (Draft)
- (f) Sections 2805(a)(1) and 2805(c)(1) of Title 10, US Code
- (g) Security Engineering Working Group website <http://sewg.nwo.usace.army.mil>

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DL1.1. Access road. Any roadway within a controlled perimeter such as a maintenance, delivery, service, emergency, or other special limited use road that is necessary for the operation of the building within that perimeter.

DL1.2. Billeting. Any building or portion of a building in which 5 or more unaccompanied DoD personnel are routinely housed. For the purposes of these standards, billeting will also include Temporary Lodging Facilities and military family housing permanently converted to unaccompanied housing with 13 or more units per building. Billeting also applies to expeditionary and temporary structures with similar population densities and functions.

DL1.3. Building hardening. Enhanced conventional construction that mitigates limited standoff distance. Building hardening may also be considered to include the prohibition of certain building options.

DL1.4. Building separation. The distance between closest points on the exterior walls of adjacent buildings.

DL1.5. Collateral damage. Injury to personnel or damage to buildings that are not the primary target of an attack.

DL1.6. Container structures. Structures built using shipping containers that are designed to withstand structural loadings associated with shipping, including CONEX and ISO containers.

DL1.7. Controlled perimeter. A physical boundary at which personnel and vehicle access is controlled at the perimeter of an installation, an area within an installation, or another area with restricted access. Where the controlled perimeter includes a shoreline and there is no defined perimeter beyond the shoreline, the boundary will be at the mean high water mark.

DL1.8. Conventional construction. Building construction that is not specifically designed to resist weapons or explosives effects. Conventional construction is designed only to resist common loadings and environmental effects such as wind, seismic, and snow loads. Unreinforced masonry is excluded from conventional construction for the purposes of these standards.

DL1.9. Design Basis Threat. The threat (aggressors, tactics, and associated weapons, tools, or explosives) against which assets within a building must be protected and upon which the security engineering design of the building is based.

DL1.10. DoD building. Any building or portion of a building owned, leased, privatized, or otherwise occupied, managed, or controlled by or for DoD.

DL1.11. DoD Components. The Office of the Secretary of Defense (OSD); the Military Departments (including their National Guard and Reserve Components); the Chairman, Joint Chiefs of Staff and Joint Staff; the Combatant Commands; the Office of the Inspector General of the Department of Defense; the Defense Agencies; the Department of Defense Field Activities; and all other organizational entities within the Department of Defense.

DL1.12. DoD personnel. Any U.S. military, DoD civilian, or family member, host nation employees working for DoD, or contractors occupying DoD buildings.

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DL1.13. Expeditionary structures. Those structures intended to be inhabited for no more than 1 year after they are erected. This group of structures typically include tents, Small and Medium Shelter Systems, Expandable Shelter Containers (ESC), ISO and CONEX containers, General Purpose Shelters, aircraft and vehicle maintenance, etc.

DL1.14. Fabric Covered/Metal Frame construction. A construction type that can be identified by a metal, load-bearing frame (usually aluminum) with some type of fabric (such as canvas) stretched or pulled over the frame. Examples of the types of structures that should be considered under this classification of structures include Frame-Supported Tensioned Fabric Structures (FSTFS), “Dome” Shelters, TEMPER Tents, Small and Medium Shelter Systems (SSS and MSS), General Purpose (GP) Medium Tents, and GP Large Tents.

DL1.15. Family housing. DoD owned or contracted quarters for DoD personnel and their dependents.

DL1.16. Glazing. The part of a window or door assembly that normally transmits light, but not air.

DL1.17. Inhabited building. Buildings or portions of buildings routinely occupied by five or more DoD personnel and with a population density of greater than one person per 40 gross square meters (430 gross square feet.) This density generally excludes industrial, maintenance, and storage facilities except for more densely populated portions of those buildings such as administrative areas. It also excludes family housing with 12 or fewer units per building. The inhabited building designation also applies to expeditionary and temporary structures with similar population densities.

DL1.18. Laminated glass. Multiple sheets of glass bonded together by a bonding interlayer.

DL1.19. Level of protection. The degree to which an asset (person, equipment, object, etc.) is protected against injury or damage from an attack.

DL1.20. Mass notification. Capability to provide real-time information to all building occupants or personnel in the immediate vicinity of a building during emergency situations.

DL1.21. Medical transitional structures and spaces. Structures that are erected or leased for temporary occupancy to maintain mission critical medical care during construction, renovation, modification, repair or restoration of an existing medical structure. Examples include urgent, ambulatory, and acute care operations.

DL1.22. Parking. Areas designated where vehicles may be left unattended.

DL1.23. Primary gathering building. Inhabited buildings or portions thereof where 50 or more DoD personnel routinely gather, and family housing with 13 or more family units per building. The primary gathering building designation also applies to expeditionary and temporary structures with similar population densities.

DL1.24. Progressive collapse. A chain reaction failure of building members to an extent disproportionate to the original localized damage. Such damage may result in upper floors of a building collapsing onto lower floors.

DL1.25. Roadways. Any surface intended for motorized vehicle traffic.

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1 **DL1.26. Routinely occupied.** For the purposes of these standards, an established or predictable pattern
2 of activity within a building that terrorists could recognize and exploit.
3

4 **DL1.27. Security engineering.** The process of identifying practical, risk managed short and long term
5 solutions to reduce and/or mitigate dynamic man-made hazards by integrating multiple factors, including
6 construction, equipment, manpower, and procedures.
7

8 **DL1.28. Specific threat.** Known or postulated aggressor activity focused on targeting a particular asset.
9

10 **DL1.29. Standoff distance.** A distance maintained between an exterior wall of a building and the
11 potential location for an explosive detonation.
12

13 **DL1.30. Structure group.** A cluster of expeditionary or temporary structures consisting of multiple
14 rows of individual structures.
15

16 **DL1.31. Structural glazed window systems.** Window systems in which glazing is bonded to the
17 window frame using a high-strength, high performance silicone sealant.
18

19 **DL1.32. Superstructure.** The supporting elements of a building above the foundation.
20

21 **DL1.33. Temporary structures.** Those structures that are erected with an expected occupancy of 3
22 years or less. This group of structures typically includes, but is not limited to, such things as Southeast
23 Asia (SEA) Huts, hardback tents, ISO and CONEX containers, pre-engineered buildings, trailers, and
24 stress tensioned shelters.
25

26 **DL1.34. TNT equivalent weight.** The weight of TNT (trinitrotoluene) that has an equivalent energetic
27 output to that of a different weight of another explosive compound.
28

29 **DL1.35. Wood Frame/Rigid Wall construction.** Structure types composed of wood frames or rigid
30 wall construction using other than wood such as honeycomb panels and stressed skins. Examples include
31 Expandable Shelter Containers (ESC), General Purpose (GP) Shelters, Aircraft Hangers (ACH), UBK
32 Kabins, Southeast (SEA) Huts, trailers, and hardback tents.
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C1. CHAPTER 1

INTRODUCTION

C1.1. GENERAL. This document represents a significant commitment by DoD to seek effective ways to minimize the likelihood of mass casualties from terrorist attacks against our personnel in the buildings in which they work and live.

C1.1.1. Dynamic threat environment. Terrorism is real, evolving, and continues to increase in frequency and lethality throughout the world. The unyielding, tenacious, and patient nature of the terrorists targeting DoD interests forces us to closely examine existing policies and practices for deterring, disrupting, and mitigating potential attacks. Today, terrorist attacks can impact anyone, at any time, at any location, and can take many forms. Deterrence against terrorist attacks begins with properly trained and equipped DoD personnel employing effective procedures. While terrorists have many tactics available to them, they frequently use explosive devices when they target large numbers of DoD personnel. Most existing DoD buildings offer little protection from terrorist attacks. By applying the DoD Antiterrorism Construction Standards described in this document, we become a smaller target of opportunity for terrorists.

C1.1.2. Responsibility. The heads of the DoD Components shall ensure compliance with these standards, but it is ultimately the commanders' responsibility to manage and mitigate the risk of DoD personnel being killed or injured in a terrorist attack. All DoD personnel have an inherent responsibility to minimize opportunities for terrorists to target them, their co-workers, and their families. Other critical DoD assets must also be identified and similarly safeguarded, but protection of those assets is beyond the scope of these standards. Within the range of potential threats and site specific issues and constraints, available personnel and resources must be properly focused, synchronized, and integrated before effective measures can be identified, implemented, and refined for each installation and activity.

C1.1.3. Planning and integration. When the best procedures, proper training, and appropriate equipment fail to deter terrorist attacks, adherence to these standards goes far in mitigating the possibility of mass casualties from terrorist attacks against DoD personnel in the buildings in which they work and live. Although predicting the specific threat to everyone is not possible, proper planning and integration of those plans provides a solid foundation for preventing, and if necessary reacting, when terrorist incidents or other emergencies unfold. An effective planning process facilitates the necessary decision making, clarifies roles and responsibilities, and ensures support actions generally go as planned. This planning process is executed by a team consisting of people from the chain of command and key personnel from all appropriate functional areas who have an interest in the building and its operation. The team should include, as a minimum, intelligence, security, and facility engineering personnel. This team is responsible for identifying requirements for the project, facilitating the development of supporting operational procedures, obtaining adequate resources, and properly supporting all other efforts needed to prudently enhance protection of the occupants of every inhabited DoD building. For further information on planning and integration, refer to the DoD Security Engineering Manual.

C1.2. STANDARDS AND RECOMMENDATIONS. Mandatory DoD antiterrorism construction standards for new and existing inhabited buildings are contained in Appendix AP1. Additional recommended measures for new and existing inhabited buildings are included in Appendix AP2. Mandatory DoD antiterrorism construction standards for expeditionary and temporary structures are contained in Appendix AP3.

C1.3. INTENT. The intent of these standards is to minimize the possibility of mass casualties in buildings or portions of buildings owned, leased, privatized, or otherwise occupied, managed, or

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controlled by or for DoD. These standards provide appropriate, implementable, and enforceable measures to establish a level of protection against terrorist attacks for all inhabited DoD buildings where no known threat of terrorist activity currently exists. While complete protection against all potential threats for every inhabited building is cost prohibitive, the intent of these standards can be achieved through prudent master planning, real estate acquisition, and construction practices. Where the minimum standoff distances detailed in these standards are met, most conventional construction techniques can be used with only marginal impact on the total construction or renovation cost. The financial impact of these standards will be significantly less than the economic and intangible costs of a mass casualty event.

C1.4. LEVELS OF PROTECTION. The levels of protection provided by these standards meet the intent described above and establish a foundation for the rapid application of additional protective measures in a higher threat environment. These standards may be supplemented where specific terrorist threats are identified, where more stringent local standards apply, or where local commanders dictate additional measures. Detailed descriptions of the levels of protection are provided in Chapter 2 and the DoD Security Engineering Manual.

C1.4.1. DoD Component standards. Where DoD Component standards such as geographic CINC standards address unique requirements, those standards will be incorporated in accordance with their implementing directives, but not to the exclusion of these standards.

C1.4.2. Threat specific requirements. Where a design basis threat is identified whose mitigation requires protective measures beyond those required by these standards or DoD Component standards, those measures will be developed in accordance with the provisions of the DoD Security Engineering Manual. The provisions of the DoD Security Engineering Manual include the design criteria that will be the basis for the development of the protective measures, estimates of the costs of those measures, and detailed guidance for developing the measures required to mitigate the identified threat. The design criteria include the assets to be protected, the threat to those assets, and the desired level of protection. Use of the DoD Security Engineering Manual will ensure uniform application, development, and cost estimation of protective measures throughout DoD.

C1.5. APPLICABILITY. These standards apply to all DoD Components, to all DoD inhabited buildings, and to all DoD expeditionary and temporary structures in accordance with the following:

C1.5.1. New construction. Implementation of these standards is mandatory for all new construction regardless of funding source in accordance with the following:

C1.5.1.1. Military Construction (MILCON). These standards apply to MILCON projects starting with the Fiscal Year 2004 Program. Projects programmed or designed under the DoD Interim Antiterrorism / Force Protection Construction Standards do not have to be reprogrammed or redesigned to meet the requirements of these standards. The provisions of the Interim Standards will apply to those projects. Due to minor changes between these standards and the Interim Standards, projects prior to the Fiscal Year 2004 Program should comply with these standards where possible.

C1.5.1.2. Other funding sources. These standards apply to all new construction projects funded by sources other than MILCON (including host nation and other foreign government funding) starting with Fiscal Year 2004. Projects funded prior to that fiscal year should comply with these standards where possible.

C1.5.2. Existing buildings. These standards will apply to existing facilities starting with the Fiscal Year 2004 program when triggered as specified below, regardless of funding source. Projects funded prior to that fiscal year should comply with these standards where possible.

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2 **C1.5.2.1. Major investments.** Implementation of these standards to bring an entire
3 building into compliance is mandatory for all DoD building renovations, modifications, repairs, and
4 restorations where those costs exceed 50% of the replacement cost of the building except as otherwise
5 stated in these standards. The 50% cost is exclusive of the costs identified to meet these standards.
6 Where the 50% threshold is not met, compliance with these standards is recommended.
7

8 **C1.5.2.2. Conversion of use.** Implementation of these standards is mandatory any time
9 a building or portion thereof is modified from its current use to use as an inhabited building, billeting, or a
10 primary gathering building. Examples would be a warehouse (uninhabited) being converted to
11 administrative (inhabited) use and an inhabited administrative building being converted to a primary
12 gathering building or billeting.
13

14 **C1.5.2.3. Glazing replacement.** Implementation of the glazing provisions of these
15 standards is mandatory for existing inhabited buildings whenever there is a planned window or door
16 glazing replacement project. Such replacements may require window frame modification or replacement.
17

18 **C1.5.3. Building additions.** Additions to existing inhabited buildings shall comply with the
19 standards for new construction. If the addition is 50% or more of the gross area of the existing building,
20 the existing building shall comply with the standards for existing construction. All additions to inhabited
21 buildings shall be structurally independent of the existing buildings.
22

23 **C1.5.4. Leased buildings.** Implementation of these standards is mandatory for all facilities
24 leased for DoD use and for those buildings in which DoD receives a space assignment from another
25 government agency. This requirement is intended to cover all situations, including General Services
26 Administration space, privatized buildings, and host-nation and other foreign government buildings. This
27 requirement is applicable for all new leases executed after 1 October 2003. This requirement also applies
28 to renewal or extension of any existing lease after 1 October 2006. Leases executed prior to the above
29 fiscal years will comply with these standards where possible.
30

31 **C1.5.4.1. Partial occupancy.** These standards only apply where DoD personnel occupy
32 leased or assigned space constituting at least 25 percent of the total floor area, and they only apply to that
33 portion of the building that is occupied by DoD personnel.
34

35 **C1.5.4.2. New buildings.** Buildings that are built to lease to DoD as of the effective
36 date established above shall comply with the standards for new construction.
37

38 **C1.5.4.3. Existing buildings.** For new leases of existing buildings or renewals of leases,
39 the standards for existing buildings shall apply in accordance with the effective dates established above.
40 For those existing buildings, protective measures other than those specified in this standard may be used
41 if they provide similar levels of protection to those required by this standard. An example would be using
42 fragment retention film on existing glass instead of replacing it with laminated glass. Refer to the DoD
43 Security Engineering Manual for guidance on mitigating measures.
44

45 **C1.5.5. Expeditionary and Temporary Structures.** Implementation of these standards is
46 mandatory for all expeditionary and temporary structures that meet the occupancy criteria for inhabited or
47 primary gathering buildings or billeting. See Appendix AP3 for structure types that meet the
48 expeditionary and temporary structures criteria.
49

50 **C1.5.5.1. New structures.** These standards apply to all new expeditionary sites
51 effective immediately.

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1
2 **C1.5.5.2. Existing structures.** These standards will apply to all existing expeditionary
3 activities beginning in Fiscal Year 2004.
4

5 **C1.5.6. Exemptions.** Unless DoD components dictate otherwise, the following buildings are
6 exempt from requirements of these standards as specified below. However, compliance with these
7 standards for those buildings is recommended where possible. Exemptions to elements of individual
8 standards are included in the text of those standards in appendix AP1. The rationale for all exemptions is
9 detailed in chapter 2.
10

11 **C1.5.6.1. Stand-alone franchised food operations.** These buildings are exempt from
12 standoff distances to parking and roadways. All other standards apply.
13

14 **C1.5.6.2. Stand alone shoppettes, mini marts and similarly sized commissaries.**
15 These buildings are exempt from standoff distances to parking and roadways. All other standards apply.
16

17 **C1.5.6.3. Family housing with 12 units or fewer per building.** These buildings are
18 exempt from all provisions of these standards.
19

20 **C1.5.6.4. Medical transitional structures and spaces.** These structures are exempt
21 from all provisions of these standards.
22

23 **C1.5.6.5. Gas stations and car care centers.** These facilities are exempt from all
24 provisions of these standards.
25

26 **C1.6. PROGRAMMING.**
27

28 **C1.6.1. Documentation.** The inclusion of these standards into DoD construction or the
29 inclusion of protective measures above the requirements of these standards will be incorporated into the
30 appropriate construction programming documents (such as the DD Form 1391) in accordance with DoD
31 Component guidance. Refer to the DoD Security Engineering Manual for guidance on the costs for
32 implementing these standards and for providing protective measures beyond these standards.
33

34 **C1.6.2. Funding Thresholds.** For existing construction, DoD AT construction standards are
35 intended solely to correct design deficiencies to appropriately address life-threatening terrorist risks. As a
36 result, funding thresholds for Unspecified Minor Military Construction and Operations and Maintenance
37 funding may be increased in accordance with 10 USC Sections 2805(a)(1) and 2805 (c)(1).
38

39 **C1.7. INFORMATION SENSITIVITY.** Some information in this standard is exempt from mandatory
40 disclosure under the Freedom of Information Act. The sensitive information that is exempt is the
41 explosive weights upon which the minimum standoff distances are based. Allowing potential aggressors
42 to know the minimum explosive weights that all DoD inhabited buildings are designed to resist could
43 constitute a vulnerability. To minimize the possibility of that information being used against DoD
44 personnel, the following provisions apply:
45

46 **C1.7.1. Distribution.** Follow governing DoD and Component guidance for specific
47 requirements for handling and distribution of For Official Use Only information. In general, distribution
48 of this document is authorized only to U.S. Government agencies and their contractors, although portions
49 of the document that are not indicated to be For Official Use Only can be removed from the document
50 and may be distributed to the public without limitation. In addition, where it is within Status of Forces
51 Agreements (SOFA) or other similar information exchange agreements, the information in this standard

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1 may be distributed to host nation elements for the purposes of their administration and design of host
2 nation funded or designed construction.
3

4 **C1.7.2. Posting to the Internet.** Because this document is For Official Use Only it cannot be
5 posted in its entirety to any web site that is accessible to the general public. It can, however, be posted if
6 the For Official Use Only information is removed (Tables AP1.1. and AP3.1.) In addition, other
7 documents that include information from this standard that is identified as For Official Use Only cannot
8 be posted to web sites accessible to the general public. For Official Use Only information may be posted
9 to protected, non-publicly accessible web sites that comply with standards established by DoD for
10 administration of web sites.
11

12 **C1.7.3. Plans and specifications.** Construction plans and specifications should include only that
13 information from this document that is necessary for a contractor to develop a bid on a project. The
14 explosive weights used in these standards shall not be entered into the plans and specifications unless the
15 plans and specifications are properly safeguarded. Plans and specifications may be posted to the Internet
16 in accordance with existing Component guidance, but such documents will not include For Official Use
17 Only information. All plans and specifications for inhabited buildings shall include an annotation that
18 cites the version of this standard that was used for design.
19

20 **C1.7.4. Design – build contracts.** Where design – build contracts are employed, prospective
21 contractors will be responsible for developing a design proposal for that project that may be impacted by
22 provisions of these standards. Where that is the case, consider alternate means to provide sufficient
23 information to support their proposals. Consider for example, either specifying specific design loads or
24 specifying the required standoff distance and providing candidate structural systems that would allow for
25 mitigation of the applicable explosive if that standoff was less than the minimum. Once the design –
26 build contract is awarded the contractor will be eligible to receive this complete document for use in the
27 development of the final design package, but that contractor will be responsible for protecting the
28 integrity of the information throughout the contract and through any subcontracts into which that
29 contractor might enter.
30
31
32

DRAFT**C2. CHAPTER 2****PHILOSOPHY, ASSUMPTIONS, AND DESIGN STRATEGIES**

C2.1. GENERAL. The purpose of this chapter is to clarify the philosophy on which these standards are based, the assumptions inherent in their provisions, and the design strategies that are their foundation. Effective implementation of these standards depends on a reasonable understanding of the rationale for them. With this understanding, engineers and security and force protection personnel can maximize the efficiency of their solutions for complying with the standards while considering site-specific issues and constraints.

C2.2. PHILOSOPHY. The overarching philosophy upon which this document is based is that comprehensive protection against the range of possible threats may be cost prohibitive, but that an appropriate level of protection can be provided for all DoD personnel at a reasonable cost. That level of protection is intended to lessen the risk of mass casualties resulting from terrorist attacks. Full implementation of these standards will provide some protection against all threats and will significantly reduce injuries for the threats upon which these standards are based. The costs associated with those levels of protection are assumed to be less than the physical and intangible costs associated with incurring mass casualties. Furthermore, given what we know about terrorism, all DoD decision makers must commit to making smarter investments with our scarce resources, and stop investing money in inadequate buildings that DoD personnel will have to occupy for decades, regardless of the environment. There are three key elements of this philosophy that influence the implementation of these standards.

C2.2.1. Time. Protective measures needed to provide the appropriate level of protection must be in place prior to the initiation of a terrorist attack. Incorporating those measures into DoD buildings is least expensive at the time those buildings are either being constructed or are undergoing major renovation, repair, restoration, or modification.

C2.2.2. Master planning. Many of these standards significantly impact master planning. The most significant such impact will be in standoff distances. If standoff distances are not “reserved” they will be encroached upon and will not be available should they become necessary in a higher threat environment. The master planning implications of these standards are not intended to be resolved overnight. They should be considered to be a blueprint for facilities and installations that will be implemented over decades as those facilities and installations evolve.

C2.2.3. Design practices. The philosophy of these standards is to build greater resistance to terrorist attack into all inhabited structures. That philosophy affects the general practice of designing inhabited buildings. While these standards are not based on a known threat, they are intended to provide the easiest and most economical methods to minimize injuries and fatalities in the event of a terrorist attack. The primary methods to achieve this outcome are to maximize standoff distance, to reduce flying debris hazards, and to construct superstructures to avoid progressive collapse. These and related design issues are intended to be incorporated into standard design practice in the future.

C2.3. ASSUMPTIONS. Several assumptions form the foundation for these standards.

C2.3.1. Baseline threat. The location, size, and nature of terrorist threats are unpredictable. These standards are based on a specific range of assumed threats that provides a reasonable baseline for the design of all inhabited DoD buildings. Designing to resist baseline threats will provide general protection today and will establish a foundation upon which to build additional measures where justified by higher threats or where the threat environment increases in the future. While those baseline threats are less than some of the terrorist attacks that have been directed against U.S. personnel in the past, it would

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be cost prohibitive to provide protection against the worst-case scenario in every building. The terrorist threats addressed in these standards are further assumed to be directed against DoD personnel. Threats to other assets and critical infrastructure are beyond the scope of these standards, but they are addressed in the DoD Security Engineering Manual. The following are the terrorist tactics upon which these standards are based:

C.2.3.1.1. Explosives. The baseline explosive weights are identified in Tables AP1.1 and AP3.1 as explosive weights I, II, and III. Their means of delivery are discussed below.

C2.3.1.1.1. Vehicle bombs. For the purposes of these standards, the vehicle bomb is assumed to be a stationary vehicle bomb. The sizes of the explosives in the vehicle bombs are based on studies that have shown that quantities of explosives associated with explosive weight I (in equivalent weight of TNT) are likely to be detected in a vehicle during a search. Therefore, explosive weight I is the basis for the standoff distances associated with the controlled perimeter. The quantity of explosives associated with explosive weight II is assumed to be able to enter the controlled perimeter undetected; therefore, explosive weight II is the basis for the standoff distances for roadways and parking. Explosive weight II was selected because it represents a tradeoff between likelihood of detection and the risk of injury or damage.

C2.3.1.1.2. Waterborne vessel bombs. For the purposes of these standards, waterborne vehicles will also be assumed to contain quantities of explosives associated with explosive weight I. That weight was selected because areas beyond the shoreline are assumed not to be controlled perimeters.

C2.3.1.1.3. Placed bombs. Hand carried explosives placed near buildings can cause significant localized damage, potentially resulting in injuries or fatalities. It is assumed that aggressors will not attempt to place explosive devices in areas near buildings where those devices could be visually detected by building occupants casually observing the area around the building. It is also assumed that there will be sufficient controls to preclude placed bombs being brought into buildings. Explosive weight II is assumed to be placed by hand either in trash containers or in the immediate vicinity of buildings. That quantity of explosives is further assumed to be built into a bomb 150 millimeters (6-inches) or greater in height.

C2.3.1.1.4. Mail bombs. Explosives in packages delivered through the mail can cause significant localized damage, injuries, and fatalities if they detonate inside a building. No assumption as to the size of such explosives is made in these standards. Provisions for mail bombs are limited to locations of mailrooms so that they can be more readily hardened if a specific threat of a mail bomb is identified in the future.

C2.3.1.2. Indirect fire weapons. For the purpose of these standards, indirect fire weapons are assumed to be military mortars with fragmentation rounds with explosive contents equivalent to explosive weight III in Tables AP1.1 and AP3.1. Protection against the effects of such rounds on an individual building is not considered practical as a minimum standard; therefore, these standards are intended to limit collateral damage to adjacent buildings from these weapons.

C2.3.1.3. Small arms. Small arms include weapons that fire rounds of a wide variety of calibers. Some standards in this document are predicated on a small arms threat. Provisions of those standards are based on the assumption that those weapons will be fired from vantage points outside the control of an installation or facility. Obscuration or screening that minimizes targeting opportunities is assumed to be the primary means of protecting DoD personnel from these weapons in these standards.

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1 **C2.3.1.4. Chemical, biological, and radiological weapons.** For the purposes of these
2 standards these weapons are assumed to be improvised weapons containing airborne agents employed by
3 terrorists. These standards do not assume comprehensive protection against this threat. They provide
4 means to reduce the potential for widespread dissemination of such agents throughout a building in the
5 event of an attack.
6

7 **C2.3.2. Controlled perimeter.** These standards assume that procedures are implemented that
8 would limit the likelihood that a vehicle carrying quantities of explosives equivalent to explosive weight I
9 in Tables AP1.1 and AP3.1 could penetrate a controlled perimeter undetected. It is further assumed that
10 any entry control point will include provisions to reject vehicles without penetrating the controlled
11 perimeter.
12

13 **C2.3.3. Levels of protection.** The potential levels of protection are described in Tables C2.1,
14 C2.2, and C2.3. These standards provide a **Low** level of protection for billeting and primary gathering
15 buildings and a **Very Low** level of protection for other inhabited buildings. Greater protection is
16 provided for primary gathering buildings and billeting because of the higher concentration of personnel
17 and the more attractive nature of the target. If the minimum standoff distances are provided, or if
18 mitigating measures are provided to achieve an equivalent level of protection, and if the threats are no
19 greater than those indicated in Tables AP1.1 and AP3.1, the risk of injuries and fatalities will be
20 minimized. Threats higher than those envisioned in Tables AP1.1 and AP3.1 will increase the likelihood
21 of injuries and fatalities, regardless of the level of protection. Refer to the DoD Security Engineering
22 Manual for detailed guidance on levels of protection and how to achieve them for a wide range of threats.
23

24 **C2.3.4. Minimum standoff distances.** The minimum standoff distances identified in Tables
25 AP1.1 and AP3.1 were developed to provide survivable structures for a wide range of conventional
26 buildings and expeditionary/temporary structures. These buildings range from tents and wood framed
27 buildings to reinforced concrete buildings. The standoff distances in the “Conventional Construction
28 Without Analysis” column in Table AP1.1 are based on explosive safety considerations that have been
29 developed based on years of experience and observation. Those standoff distances may be conservative
30 for heavy construction such as reinforced concrete or reinforced masonry; however, they may be just
31 adequate for lighter weight construction. The standoff distances in Table AP3.1 are based on blast testing
32 conducted against TEMPER Tents, SEA Huts, General Purpose Shelters, and Small Shelter Systems.
33 With adequate analysis those distances may be able to be reduced without requiring mitigating measures.
34 For a more detailed discussion of this issue, refer to the DoD Security Engineering Manual.
35

36 **C2.3.5. Exempted building types.** The rationale for some building types being exempted from
37 these standards or elements of these standards is detailed below:
38

39 **C2.3.5.1. Shoppettes, mini marts, similarly sized commissaries and stand-alone**
40 **franchised food operations.** These facilities by the nature of their operation require parking in close
41 proximity; therefore, they are exempted from the minimum standoff distances for parking and roadways.
42 Applying other upgrades required by these standards is feasible, however, and will lessen the risk of mass
43 casualties.
44

45 **C2.3.5.2. Family housing.** The exemption of family housing with 12 units or fewer in a
46 single building acknowledges that the density of such units is generally low, reducing the likelihood of
47 mass casualties. It also acknowledges the fact that family housing has rarely been directly targeted by
48 terrorists. A further assumption for existing family housing with 13 or more units per building is that by
49 designating parking spaces for specific residents or residences, the risk of parking vehicle bombs in those
50 parking areas is reduced due to increased awareness of the vehicles that are authorized to park there.
51

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Table C2.1 Levels of Protection – New Construction

Level of Protection	Potential Structural Damage	Potential Door and Glazing Hazards	Potential Injury
Very Low	Heavily damaged - onset of structural collapse: Major deformation of primary and secondary structural members, but progressive collapse is unlikely. Collapse of non-structural elements.	Glazing will break and is likely to be propelled into the building, resulting in serious glazing fragment injuries, but fragments will be reduced. Doors may be propelled into rooms, presenting serious hazards.	Majority of personnel suffer serious injuries. There are likely to be a limited number (10% to 25%) of fatalities.
Low	Damaged – unrepairable. Major deformation of non-structural elements and secondary structural members and minor deformation of primary structural members, but progressive collapse is unlikely.	Glazing will break, but fall within 1 meter of the wall or otherwise not present a significant fragment hazard. Doors may fail, but they will rebound out of their frames, presenting minimal hazards.	Majority of personnel suffer significant injuries. There may be a few (<10%) fatalities.
Medium	Damaged – repairable. Minor deformations of non-structural elements and secondary structural members and no permanent deformation in primary structural members.	Glazing will break, but will remain in the window frame. Doors will stay in frames, but will not be reusable.	Some minor injuries, but fatalities are unlikely.
High	Superficially damaged. No permanent deformation of primary and secondary structural members or non-structural elements.	Glazing will not break. Doors will be reusable.	Only superficial injuries are likely.

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Table C2.2 Levels of Protection – Existing Construction

Level of Protection	Potential Structural Damage	Potential Door and Glazing Hazards	Potential Injury
Very Low	Heavily damaged - onset of structural collapse: Major deformation of primary structural members, but progressive collapse is unlikely. Collapse of secondary structural members and non-structural elements.	Glazing will break and is likely to be propelled into the building, resulting in serious glazing fragment injuries, but fragments will be reduced. Doors may be propelled into rooms, presenting serious hazards.	Majority of personnel suffer serious injuries. There are likely to be a limited number (10% to 25%) of fatalities.
Low	Damaged – unrepairable. Major deformation of secondary structural members and minor deformation of primary structural members, but progressive collapse is unlikely. Collapse of non-structural elements.	Glazing will break and is likely to be propelled into the building, but should result in survivable glazing fragment injuries. Doors may fail, but they will rebound out of their frames, presenting minimal hazards.	Majority of personnel suffer significant injuries. There may be a few (<10%) fatalities.
Medium	Damaged – repairable. Minor deformations of secondary structural members and no permanent deformation in primary structural members. Major deformation of non-structural elements.	Glazing will break, but will remain in the window frame. Doors will stay in frames, but will not be reusable.	Some minor injuries, but fatalities are unlikely.
High	Superficially damaged. No permanent deformation of primary and secondary structural members or non-structural elements.	Glazing will not break. Doors will be reusable.	Only superficial injuries are likely.

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Table C2.3 Levels of Protection – Expeditionary/Temporary Construction		
Level of Protection	Potential Structural Damage	Potential Injury
Very Low	Heavily damaged. Major portions of the structure will collapse (over 50%). A significant percentage of secondary structural members will collapse (over 50%)	Majority of personnel suffer serious injuries. There are likely to be a limited number (10% to 25%) of fatalities.
Low	Damaged – unrepairable. Some sections of the structure may collapse or lose structural capacity (10 to 20% of structure).	Majority of personnel suffer significant injuries. There may be a few (<10%) fatalities.
Medium	Damaged – repairable. Minor to major deformations of both structural and non-structural. Some secondary debris will be likely, but the structure remains intact with collapse unlikely.	Some minor injuries, but no fatalities are likely.
High	Superficially damage. No permanent deformation of primary and secondary structural members or non-structural elements.	Only superficial injuries are likely.

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1 **C2.3.5.3. Gas stations and car care centers.** These facilities are exempted from these
2 standards because, by the nature of their operation, cars must be allowed to be in close proximity to them.
3 Other measures included in these standards would be ineffective in the absence of any control on
4 vehicles. In addition, these facilities are not routinely occupied by 5 or more personnel.
5

6 **C2.3.5.4. Medical transitional structures and spaces.** These structures and spaces
7 may be required for limited durations to maintain mission critical operations during construction that
8 require close proximity or physical connection to the existing building undergoing construction. This
9 may make compliance with these standards impractical during the limited construction duration.
10

11 **C2.3.6. Policies and procedures.** Policies and procedures are a critical adjunct to construction
12 standards. It is assumed that there are means to control access to controlled perimeters, underground
13 parking, and other locations where vehicle access needs to be limited. It is further assumed that unusual
14 packages or containers or improperly parked vehicles will be recognized as potential terrorist threats and
15 appropriate reactive measures will be implemented to reduce the potential for casualties. Finally, it is
16 assumed that policies and procedures will be developed to support these and other related issues and that
17 those policies and procedures will be incorporated into antiterrorism plans, training, and exercises.
18

19 **C2.3.7. Training.** It is assumed that key security and facility personnel will receive training in
20 security engineering, antiterrorism, and related areas. Refer to the Security Engineering Working Group
21 website for available training and to DoD 2000.12-H for additional information on training issues. It is
22 further assumed that all DoD personnel have been trained in basic antiterrorism awareness in accordance
23 with DODI 2000.16, that they are able to recognize potential threats, and that they know the proper
24 courses of action should they detect a potential threat.
25

26 **C2.3.8. Design codes.** It is assumed that the provisions of these standards will be coordinated
27 with all other applicable building and design codes and Federal building policies. Nothing in these
28 standards should be interpreted to supercede the provisions of any other applicable building or design
29 code. Where other codes mandate more stringent requirements it is assumed that the provisions of those
30 codes will be followed.
31

32 **C2.3.9. Expeditionary and temporary structures.** Expeditionary and temporary structures are
33 commonly built of either combinations of metal frames and fabric or wood frames and rigid walls.
34 It is assumed that most expeditionary and temporary structures cannot be retrofitted or hardened
35 sufficiently for higher threats; therefore, unless adequate planning is done to obtain the needed space to
36 achieve appropriate standoff, DoD personnel will be highly vulnerable to terrorist attack.
37

38 **C2.4. DESIGN STRATEGIES.** There are seven major design strategies that are applied throughout
39 these standards. They do not account for all of the measures considered in the standards, but they were
40 the most effective and economical in protecting DoD personnel from terrorist attacks. These strategies are
41 summarized below.
42

43 **C2.4.1. Maximize standoff distance.** The primary design strategy is to keep terrorists as far
44 away from inhabited DoD buildings as possible. The easiest and least costly opportunity for achieving
45 the appropriate levels of protection against terrorist threats is to incorporate sufficient standoff distance
46 into project designs. While sufficient standoff distance is not always available to provide the minimum
47 standoff distances required for conventional construction, maximizing the available standoff distance
48 always results in the most cost effective solution. Maximizing standoff distance also ensures that there is
49 opportunity in the future to upgrade buildings to meet increased threats or to accommodate higher levels
50 of protection.
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1 **C2.4.2. Prevent building collapse.** Provisions relating to preventing building collapse and
2 building component failure are essential to effectively protecting building occupants. Designing those
3 provisions into buildings during new construction or retrofitting during major renovations, repairs,
4 restorations, or modifications of existing buildings is the most cost effective time to do that.

5
6 **C2.4.3. Minimize hazardous flying debris.** In past explosive events where there was no
7 building collapse, a high number of injuries resulted from flying glass fragments and debris from walls,
8 ceilings, and fixtures (non-structural features.) The glass used in most windows breaks at very low blast
9 pressures resulting in hazardous, dagger-like shards. Minimizing those hazards has a major effect on
10 limiting mass casualties. Window and door designs must treat glazing, frames, connections, and the
11 structural components to which they are attached as an integrated system. Hazardous fragments may also
12 include secondary debris such as those from concrete barriers and site furnishings.

13
14 **C2.4.4. Provide effective building layout.** Simple changes in building layout and orientation
15 can significantly reduce opportunities for terrorists to target building occupants or injure large numbers of
16 people.

17
18 **C2.4.5. Limit airborne contamination.** Simple changes to heating, ventilation, and air
19 conditioning (HVAC) systems can significantly reduce the potential for chemical, biological, and
20 radiological agents being distributed throughout buildings.

21
22 **C2.4.6. Provide mass notification.** Providing a timely means to notify building occupants of
23 threats and what should be done in response to those threats reduces the risk of mass casualties.

24
25 **C2.4.7. Facilitate future upgrades.** Many of the provisions of these standards facilitate
26 opportunities to upgrade building protective measures in the future if the threat environment changes.
27

DRAFT**AP1. APPENDIX 1****DoD ANTITERRORISM MINIMUM CONSTRUCTION STANDARDS
FOR NEW AND EXISTING BUILDINGS**

AP1.1. SITE PLANNING. Operational, logistic, and security requirements must be integrated in the overall design of buildings, equipment, landscaping, parking, roads, and other features. The most cost-effective solution to mitigating explosive effects on buildings is to keep explosives as far as possible from them. Standoff distance must be coupled with appropriate building hardening to provide the necessary level of protection to DoD personnel. The following standards detail minimum standoff distances that when achieved will allow for buildings to be built with minimal additional construction costs. Where these standoff distances cannot be achieved because land is unavailable, the standards allow for building hardening to mitigate the blast effects. Costs and requirements for building hardening are addressed in the DoD Security Engineering Manual.

AP1.1.1. Standard 1. Minimum Standoff Distances. The minimum standoff distances apply to all new and existing (when triggered) DoD buildings covered by these standards. The minimum standoff distances are presented in Table AP1.1 and illustrated in Figures AP1.1 and AP1.2. Where the standoff distances in the “Conventional Construction Without Analysis” column of Table AP1.1 can be met, conventional construction may be used for the buildings without a specific analysis of blast effects, except as otherwise required in these standards. Where those distances are not available, the building must be analyzed by a qualified engineer and hardened as necessary to mitigate the effects of the explosives indicated in Table AP1.1 at the achievable standoff distance to the appropriate level of protection. The appropriate levels of protection for each building category are shown in Table AP1.1 and are described in Tables C2.1 and C2.2 and in the DoD Security Engineering Manual. Standoff distances of less than those shown in the “Conventional Construction With Analysis” column in Table AP1.1 are not allowed.

AP1.1.1.1. Controlled perimeter. The standoff distance will be measured from the closest point on the building exterior to the controlled perimeter.

AP1.1.1.2. Parking and roadways. Standoff distances for parking and roadways are based on the assumption that there is a controlled perimeter at which larger vehicle bombs will be detected and kept from entering the controlled perimeter. Where there is a controlled perimeter, the standoff distances and explosive weight associated with parking and roadways in Table AP1.1 apply. If there is no controlled perimeter, it must be assumed that the larger explosive weights upon which the controlled perimeter standoff distances are based (explosive weight I from Table AP1.1.) can access parking and roadways near buildings. Therefore, where there is no controlled perimeter, standoff distances from parking and roadways will be in accordance with the distances and the explosive weight associated with controlled perimeters in Table AP1.1. In addition the following apply:

AP1.1.1.2.1. All inhabited buildings. The standoff distance will be measured from the closest point on the building exterior to the closest edge of parking areas and roadways. The minimum standoff for all buildings regardless of hardening or analysis will be 10 meters for both parking areas and roadways.

AP1.1.1.2.2. Existing inhabited buildings. Where possible, move parking and roadways away from existing buildings in accordance with the standoff distances and explosive weights in Table AP1.1. It is recognized, however, that moving existing parking areas and roadways or applying structural retrofits may be impractical; therefore, the following operational options are provided for existing inhabited buildings:

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AP1.1.1.2.2.1. Surface parking areas. Establish entry control to portions of surface parking areas that are closer than the required standoff distance to ensure unauthorized vehicles are not allowed closer than the required standoff distance. For primary gathering buildings and billeting if entry control is provided to prevent unauthorized parking within the required standoff distance, controlled surface parking may be permitted as close as 10 meters (33 feet) without hardening or analysis.

AP1.1.1.2.2.2. Roadways. Eliminate parking on roadways within the required standoff distances along roads adjacent to existing buildings covered by these standards.

AP1.1.1.2.3. Family housing. For existing family housing with 13 or more units per building within a controlled perimeter, parking within the required standoff distances may be allowed where designated parking spaces are assigned for specific residents or residences. Where there are existing standoff distances less than the required standoff distances, those existing distances shall not be encroached upon.

AP1.1.1.3. Parking and roadway projects. Where practical, all roadway and parking area projects should comply with the standoff distances from inhabited buildings in Table AP1.1. Where parking or roadways that are within the standoff distances in Table AP1.1 from existing buildings are being constructed, expanded, or relocated, those parking areas and roadways shall not be allowed to encroach on the existing standoff distances of any existing inhabited building. That applies even where such projects are not associated with a building renovation, modification, repair, or restoration requiring compliance with these standards

AP1.1.1.4. Trash containers. The standoff distance will be measured from the closest point on the building exterior to the nearest point of the trash container or trash container enclosure. Where the standoff distance is not available, hardening of trash enclosures to mitigate the direct blast effects and secondary fragment effects of the explosive on the building is acceptable if the applicable level of protection can be proven by analysis. If trash enclosures are completely enclosed on all sides and the top to preclude introduction of objects into the enclosures and the enclosures are secured so that unauthorized personnel cannot access them, they can be located closer to the building as long as they do not violate the unobstructed space provisions of Standard 3. Openings in screening materials and gaps between the ground and screens or walls making up an enclosure will not be greater than 150 mm (six inches).

AP1.1.2. Standard 2. Building separation. Building separation requirements are established to minimize the possibility that an attack on one building causes injuries or fatalities in adjacent buildings. The separation distance is predicated on the potential use of indirect fire weapons.

AP1.1.2.1. Billeting and primary gathering buildings. For all new billeting and primary gathering buildings ensure that adjacent inhabited buildings are separated by at least the distances in Table AP1.1. Where it is necessary to encroach on those building separations, analyze the structure and provide hardened building components as necessary to mitigate the effects of the explosive indicated in Table AP1.1 to the appropriate level of protection shown in Table AP1.1. Levels of protection are described in Table C1.1 and in the DoD Security Engineering Manual.

AP1.1.2.2. Other inhabited buildings. There are no minimum separation distances required for antiterrorism purposes for inhabited buildings.

AP1.1.3. Standard 3. Unobstructed space. It is assumed that aggressors will not attempt to place assets in areas near buildings where their explosive devices could be visually detected by building

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occupants observing the area around the building. Therefore, ensure that obstructions within 10 meters (33 feet) of buildings covered by these standards do not allow for concealment from observation of explosive devices 150 mm (six inches) or greater in height. This does not preclude the placement of site furnishings or plantings around buildings. It only requires conditions such that any explosive devices placed in that space would be observable by building occupants.

AP1.1.3.1. Electrical and mechanical equipment. The preferred location of electrical and mechanical equipment such as transformers, air cooled condensers, and packaged chillers is outside the unobstructed space or on the roof, but this standard does not preclude placement within the unobstructed space as long the equipment provides no opportunity for concealment of explosive devices.

AP1.3.1.2. Equipment enclosures. If walls or other screening devices with more than two sides are placed around electrical or mechanical equipment within the unobstructed space, the equipment will be enclosed on all four sides and the top. Openings in screening materials and gaps between the ground and screens or walls making up an enclosure will not be greater than 150 mm (six inches). Any surfaces of the enclosures that can be opened will be secured so that unauthorized personnel cannot gain access through them.

AP1.1.4. Standard 4. Drive-up / drop-off and access roads. Some facilities require access to areas within the required standoff distance for dropping off or picking up people or loading or unloading packages and other objects. Examples that may require drive-up / drop off include, but are not limited to, medical facilities, exchanges and commissaries, child care centers, and schools.

AP1.1.4.1. Marking. Where operational or safety considerations require drive-up or drop-off areas, drive through lanes, or other access roads near buildings, ensure those areas or lanes are clearly defined and marked and that their intended use is clear to prevent parking of vehicles in those areas.

AP1.1.4.2. Unattended vehicles. Do not allow unattended vehicles in drive-up or drop-off areas or drive through lanes.

AP1.1.4.3. Access control. Ensure that access control measures are implemented to prohibit unauthorized vehicles from using access roads within the applicable standoff distances in Table AP1.1.

AP1.1.4.4. Location. Do not allow drive-up / drop-off, drive through lanes, or other access roads to be located under any inhabited portion of a building.

AP1.1.5. Standard 5. Parking beneath buildings. Eliminate parking beneath buildings. Where very limited real estate makes parking beneath buildings unavoidable, the following measures must be incorporated into the design for new buildings or mitigating measures must be incorporated into existing buildings to achieve an equivalent level of protection.

AP1.1.5.1. Access control. Ensure that personnel and vehicle access at personnel and vehicle entrances to parking areas is physically controlled.

AP1.1.5.2. Floors. Ensure that the floors beneath inhabited areas will not breach from the detonation in the parking area of an explosive equivalent to explosive weight II in Table AP 1.1.

AP1.1.5.3. Superstructure. All structural elements within and adjacent to the parking area will be subject to the progressive collapse provisions of Standard 6, including the provision for loss of lateral support for vertical load carrying elements.

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**Table AP1.1 Minimum Standoff Distances and Building Separations
For New and Existing Construction**

Location	Building Category	Standoff Distance or Separation Requirements			
		Applicable Level of Protection	Conventional Construction without Analysis	Conventional Construction with Analysis ⁽¹⁾	⁽²⁾
Controlled Perimeter or Parking and Roadways without a Controlled Perimeter	Billeting	Low	45 m (148 ft.)	25 m (82 ft.)	
	Primary Gathering Building	Low	45 m (148 ft.)	25 m (82 ft.)	
	Inhabited Building	Very Low	25 m (82 ft.)	10 m (33 ft.)	
Parking and Roadways within a Controlled Perimeter	Billeting	Low	25 m (82 ft.)	10 m (33 ft.)	
	Primary Gathering Building	Low	25 m (82 ft.)	10 m (33 ft.)	
	Inhabited Building	Very Low	10 m (33 ft.)	10 m (33 ft.)	
Trash containers	Billeting	Low	25 m (82 ft.)	10 m (33 ft.)	
	Primary Gathering Building	Low	25 m (82 ft.)	10 m (33 ft.)	
	Inhabited Building	Very Low	10 m (33 ft.)	10 m (33 ft.)	
Building Separation	Billeting	Low	10 m (33 ft.)	No antiterrorism minimum	
	Primary Gathering Building	Low	10 m (33 ft.)	No antiterrorism minimum	
	Inhabited Building	Very Low	No antiterrorism minimum	No antiterrorism minimum	Not applicable

1. Standoff distances less than those in this column are not allowed even with analysis.

2. For Official Use Only (FOUO) in this column was deleted.

3. Not Used.

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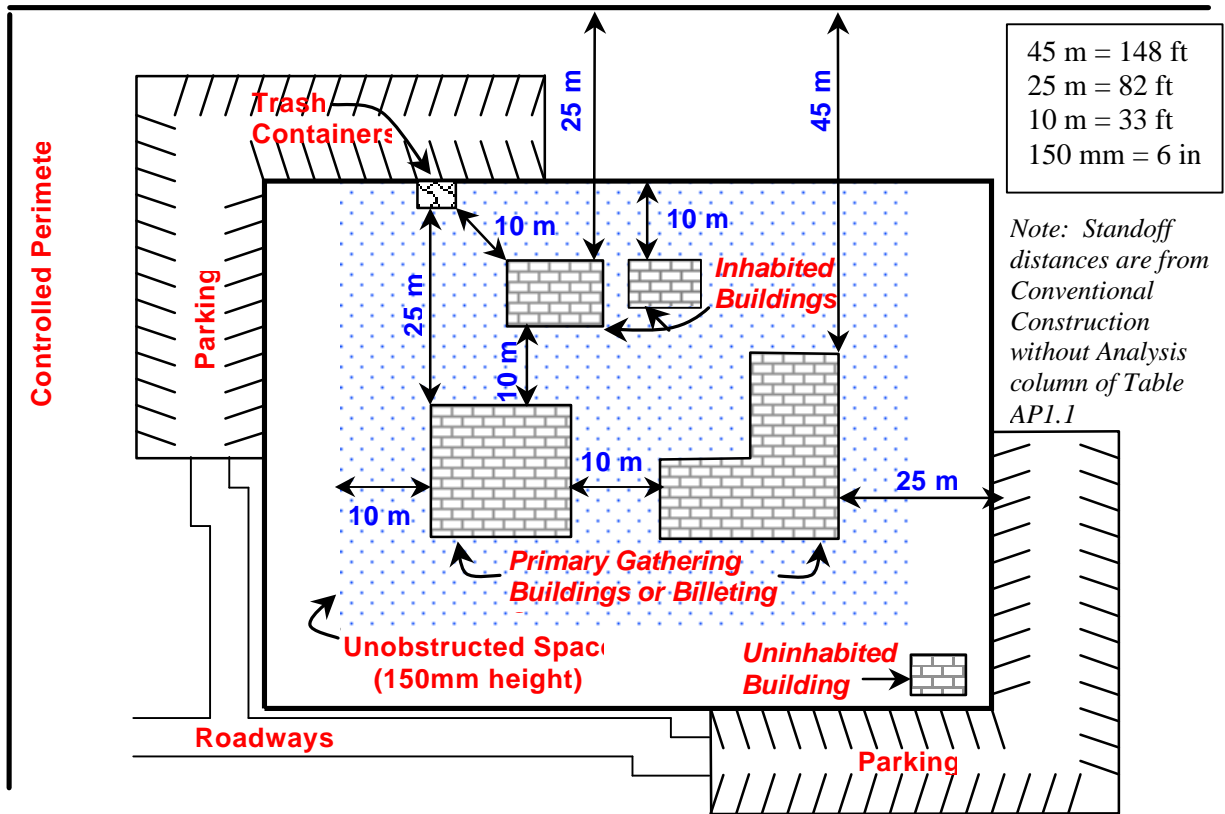
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Figure AP1.1. Standoff Distances and Building Separations - Controlled Perimeter

1

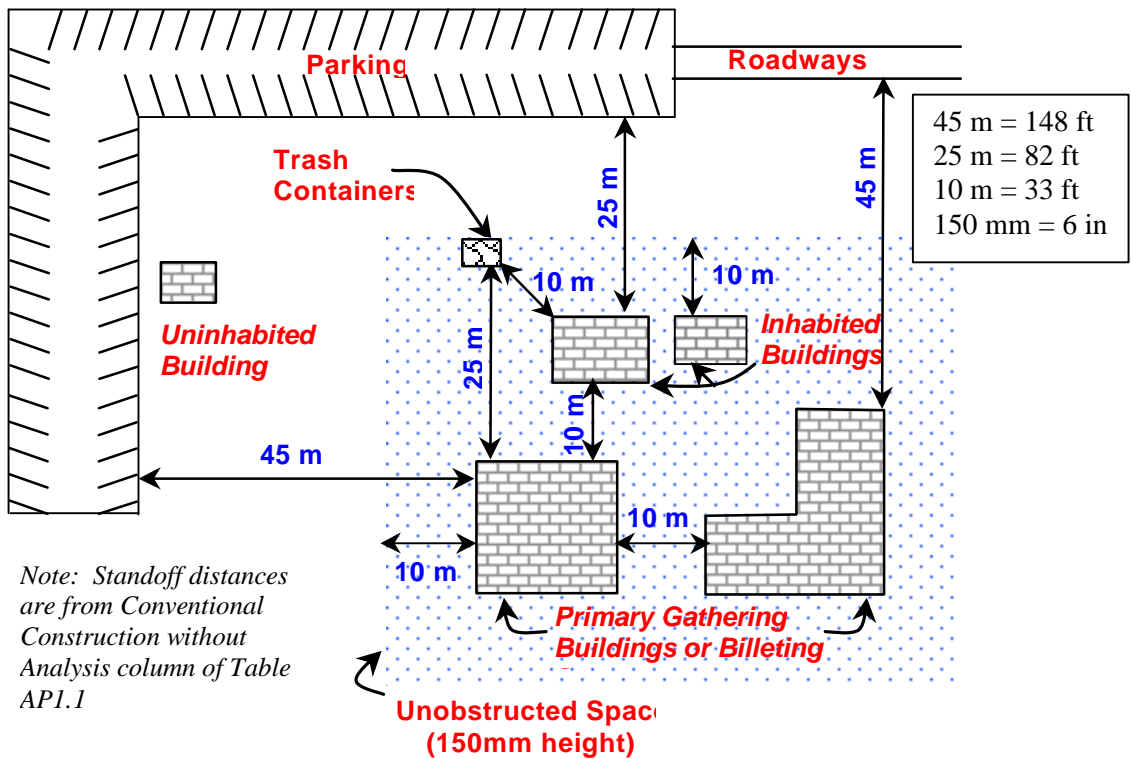


Figure AP1.2. Standoff Distances and Building Separations - No Controlled Perimeter

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AP1.2. STRUCTURAL DESIGN. If the minimum standoff distances are achieved, conventional construction should minimize the risk of mass casualties from a terrorist attack. Even if those standoff distances can be achieved, however, there are some additional structural issues that must be incorporated into building designs to ensure that buildings do not experience progressive collapse.

AP1.2.1. Standard 6. Progressive collapse avoidance. Progressive collapse is considered to be significant risk for buildings of three stories (not including basement stories) or more. For all new and existing inhabited buildings of three stories or more, design the superstructure to sustain local damage with the structural system as a whole remaining stable and not being damaged to an extent disproportionate to the original local damage. This shall be achieved through an arrangement of the structural elements that provides stability to the entire structural system by transferring loads from any locally damaged region to adjacent regions capable of resisting those loads without collapse. This shall be accomplished by providing sufficient continuity, redundancy, or energy dissipating capacity (ductility), or a combination thereof, in the members and connections of the structure. For further guidance, refer to American Society of Civil Engineers Standard 7-98 and to detailed guidance in the DoD Security Engineering Manual. In addition, the measures below apply.

AP1.2.1.1. Exterior columns and walls. Design all exterior vertical load-carrying elements to sustain a loss of lateral support at any of the floor levels by adding one story height to the nominal unsupported length. This standard is based on the assumption of an external threat. If an internal threat is postulated, this provision will also apply for internal vertical load carrying elements.

AP1.2.1.2. Exterior member removal. Analyze the structure to ensure it can withstand removal of one primary vertical or horizontal load-carrying element (i.e. a column or a beam) without progressive collapse.

AP1.2.1.3. Floors. Design all floors with improved capacity to withstand load reversals by designing them to withstand a net uplift equal to the dead load plus one-half the live load.

AP1.2.2. Standard 7. Structural isolation. Where there are areas of buildings that do not meet the criteria for inhabited buildings, design the superstructures of those areas to be structurally independent from the inhabited area. This will minimize the possibility that collapse of the uninhabited areas of the building will affect the stability of the superstructure of the inhabited portion of the building. Alternatively, verify through analysis that collapse of uninhabited portions of the building will not result in collapse of any portion of the building covered by this standard. This standard is not mandatory for existing structures, but it should be implemented where possible.

AP1.2.3. Standard 8. Building overhangs. Avoid building overhangs with inhabited spaces above them where people could gain access to the area underneath the overhang. Where such overhangs must be used, the following measures must be incorporated into the design for new buildings or mitigating measures must be incorporated into existing buildings to achieve an equivalent level of protection.

AP1.2.3.1. Access control. Ensure that there are no roadways or parking areas under overhangs.

AP1.2.3.2. Floors. Ensure that the floors beneath inhabited areas will not breach from the detonation underneath the overhang of an explosive equivalent to explosive weight II in Table AP1.1.

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AP1.2.3.3. Superstructure. All structural elements within and adjacent to the overhang will be subject to the progressive collapse provisions of Standard 6, including the provision for loss of lateral support for vertical load carrying elements.

AP1.2.4. Standard 9. Exterior masonry walls. Unreinforced masonry walls are prohibited for the exterior walls of new buildings. A minimum of 0.05 percent vertical reinforcement with a maximum spacing of 1200 mm (48 in) will be provided. For existing buildings, implement mitigating measures to provide an equivalent level of protection.

AP1.3. ARCHITECTURAL DESIGN. There are many aspects of building layout and other architectural design issues that improve overall protection of people inside buildings with little added cost.

AP1.3.1. Standard 10. Windows and glazed doors. To minimize hazards from flying glass fragments, apply the provisions for glazing and window frames below for all new and existing inhabited buildings covered by these standards. Windows and frames must work as a system to ensure that their hazard mitigation is effective. These provisions apply even if the minimum standoff distances are met.

AP1.3.1.1. Glazing. Use a minimum of 6-mm (1/4-in) nominal laminated glass for all exterior windows and glazed doors. The 6-mm (1/4-in) laminated glass consists of two nominal 3-mm (1/8-in) glass panes bonded together with a minimum of a 0.75-mm (0.030-inch) polyvinyl-butylal (PVB) interlayer. For insulated glass units, as a minimum the inner pane must be 6-mm laminated glass. For alternatives to the 6mm (1/4-in) laminated glass that meet required levels of protection, refer to the DoD Security Engineering Manual.

AP1.3.1.2. Window frames. Provide frames and mullions of aluminum or steel. Frames, mullions, and window hardware shall be designed to resist a static load of 7 kilopascals (1 lb per square in) applied to the surface of the glazing. Frame and mullion deformations shall not exceed 1/160 of the unsupported member lengths. The glazing shall have a minimum frame bite of 9.5-mm (3/8-in) for structural glazed window systems and 25-mm (1-in) for window systems that are not structurally glazed. Frame connections to surrounding walls shall be designed to resist a combined loading consisting of a tension force of 36-kg/cm (200-lbs/in) and a shear force of 13.5-kg/cm (75 lbs/in). Alternatively, use frames that provide an equivalent level of performance.

AP1.3.1.3. Mitigation. Where the minimum standoff distances cannot be met, provide glazing and frames that will provide an equivalent level of protection to that provided by the glazing above as described in Tables C2.1 and C2.2 for the applicable explosive weight in Table AP1.1.

AP1.3.1.4. Window replacement projects. Whenever window or door glazing is being replaced in existing inhabited buildings as part of a planned window or glazing replacement, whether or not the building meets the triggers in paragraph C1.5.2, install glazing that meets the requirements above.

AP1.3.2. Standard 11. Building entrance layout. The areas outside of installations are commonly not under the direct control of the installations. Where the main entrances to buildings face installation perimeters, people entering and exiting the buildings are vulnerable to being fired upon from vantage points outside the installations. To mitigate those vulnerabilities apply the following measures:

AP1.3.2.1. New buildings. For new inhabited buildings, ensure that the main entrance to the building does not face an installation perimeter or other uncontrolled vantage points with direct lines of sight to the entrance.

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1 **AP1.3.2.2. Existing buildings.** For existing inhabited buildings where the main
2 entrance faces an installation perimeter either use a different entrance as the main entrance or screen that
3 entrance to limit the ability of potential aggressors to target people entering and leaving the building.
4

5 **AP1.3.3. Standard 12. Exterior doors.** For all new and existing buildings covered by these
6 standards, ensure that all exterior doors into inhabited areas open outwards. By doing so the doors will
7 seat into the door frames in response to an explosive blast, increasing the likelihood that the doors will not
8 enter the buildings as hazardous debris.
9

10 **AP1.3.4. Standard 13. Mailrooms.** The following measures address the location of rooms to
11 which mail is delivered or in which mail is handled in new and existing inhabited buildings. The
12 measures involve limiting collateral damage and injuries and facilitating future upgrades to enhance
13 protection should they become necessary.
14

15 **AP1.3.4.1. Location.** Where a new or existing building covered by these standards must
16 have a mailroom, that mailroom will be on the perimeter of the building. By locating the mailroom on the
17 building perimeter there is an opportunity to modify it in the future if a mail bomb threat is identified.
18 Where mailrooms are located in the interior of buildings, few retrofit options are available for mitigating
19 the mail bomb threat.
20

21 **AP1.3.4.2. Proximity.** Mailrooms should also be located as far from heavily populated
22 areas of the building and critical infrastructure as possible. This measure will go far toward minimizing
23 injuries and damage if a mail bomb detonates in the mailroom where the mailroom is not specifically
24 designed to resist that threat.
25

26 **AP1.3.5. Standard 14. Roof access.** For all new and existing inhabited buildings covered by
27 these standards, control access to roofs to minimize the possibility of aggressors placing explosives or
28 chemical, biological, or radiological agents there or otherwise threatening building occupants or critical
29 infrastructure.
30

31 **AP1.3.5.1. New buildings.** For new buildings eliminate all external roof access by
32 providing access from internal stairways or ladders, such as in mechanical rooms.
33

34 **AP1.3.5.2. Existing buildings.** For existing buildings eliminate external access where
35 possible or secure external ladders or stairways with locked cages or similar mechanisms.
36

37 **AP1.3.6. Standard 15. Overhead mounted architectural features.** For all new and existing
38 buildings covered by these standards, ensure that all suspended ceiling systems and other overhead
39 mounted architectural features are mounted to minimize the likelihood that they will fall and injure
40 building occupants. All such systems will be mounted such that they resist forces of 0.5 times the
41 component weight in any direction and 1.5 times the component weight in the downward direction. This
42 standard does not preclude the need to design architectural feature mountings for forces required by other
43 criteria such as seismic standards.
44

45 **AP1.4. ELECTRICAL AND MECHANICAL DESIGN.** Electrical and mechanical design standards
46 address limiting damage to critical infrastructure, protecting building occupants against chemical,
47 biological, and radiological threats, and notification of building occupants of threats or hazards.
48

49 **AP1.4.1. Standard 16. Air intakes.** Air intakes to heating, ventilation, and air conditioning
50 (HVAC) systems that are designed to move air throughout a building that are at ground level provide an
51 opportunity for aggressors to easily place contaminants that could be drawn into the building.

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1
2 **AP1.4.1.1. New buildings.** For all new inhabited buildings covered by this document
3 locate all air intakes at least 3 meters (10-ft) above the ground.
4

5 **AP1.4.1.2. Existing buildings.** The above requirement is recommended, but not
6 mandatory, for existing inhabited buildings covered by these standards.
7

8 **AP1.4.2. Standard 17. Emergency air distribution shutoff.** For all new and existing
9 inhabited buildings provide an emergency shutoff switch in the HVAC control system that can
10 immediately shut down air distribution throughout the building. The switch (or switches) must be located
11 to be easily accessible by building occupants. Providing such a capability will allow building occupants
12 to limit the distribution of airborne contaminants that may be introduced into the building.
13

14 **AP1.4.3. Standard 18. Utility distribution and installation.** Utility systems can suffer
15 significant damage when subjected to the shock of an explosion. Some of these utilities may be critical to
16 safely evacuating personnel from the building or their destruction could cause damage that is
17 disproportionate to other building damage resulting from an explosion. To minimize the possibility of the
18 above hazards apply the following measures:
19

20 **AP1.4.3.1. Utility routing.** For all new inhabited buildings route critical or fragile
21 utilities such that they are not on exterior walls or on walls shared with mailrooms. This requirement is
22 recommended, but not mandatory, for existing buildings.
23

24 **AP1.4.3.2. Redundant utilities.** Where redundant utilities are required in accordance
25 with other requirements or criteria, ensure that the redundant utilities are not collocated or do not run in
26 the same chases. This minimizes the possibility that both sets of utilities will be adversely affected by a
27 single event.
28

29 **AP1.4.4. Standard 19. Equipment bracing.** Mount all overhead utilities and other fixtures to
30 minimize the likelihood that they will fall and injure building occupants. Design all equipment
31 mountings to resist forces of 0.5 times the equipment weight in any direction and 1.5 times the equipment
32 weight in the downward direction. This standard does not preclude the need to design equipment
33 mountings for forces required by other criteria such as seismic standards.
34

35 **AP1.4.5. Standard 20. Under building access.** To limit opportunities for aggressors placing
36 explosives underneath buildings, ensure that access to crawl spaces, utility tunnels, and other means of
37 under building access is controlled.
38

39 **AP1.4.6. Standard 21. Mass notification.** All inhabited buildings must have a timely means to
40 notify occupants of threats and instruct them what to do in response to those threats.
41

42 **AP1.4.6.1. New buildings.** All new inhabited buildings must have a capability to
43 provide real-time information to building occupants or personnel in the immediate vicinity of the building
44 during emergency situations. The information relayed must be specific enough to discriminate
45 appropriate response actions. Any system, procedure, or combination thereof that provides this capability
46 will be acceptable under this standard.
47

48 **AP1.4.6.2. Existing buildings.** For existing buildings the above requirement is
49 mandatory for primary gathering buildings and billeting, but recommended for all inhabited buildings.
50

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FOR NEW AND EXISTING BUILDINGS**

AP2.1. SITE PLANNING. The following additional measures, if implemented, will significantly enhance site security with little increase in cost and should be considered for all new and existing inhabited buildings.

AP2.1.1. Recommendation 1. Vehicle access points. The first line of defense in limiting opportunities for aggressors to get vehicles close to DoD buildings is at vehicle access points at the controlled perimeter, to parking areas, and at drive-up / drop-offs points. Keep the number of access points to the minimum necessary for operational or life safety purposes. That will limit the number of points at which access may have to be controlled with barriers and/or personnel in increased threat environments or if the threat increases in the future.

AP2.1.2. Recommendation 2. High speed vehicle approaches. The energy of a moving vehicle increases with the square of its velocity; therefore; minimizing a vehicle's speed allows vehicle barriers to be lighter and less expensive should vehicle barriers ever become necessary. To facilitate reductions in vehicle speeds in the future, ensure there are no unobstructed vehicle approaches perpendicular to perimeters at the required parking and roadway standoff distances.

AP2.1.3. Recommendation 3. Vantage points. Vantage points are natural or man-made positions from which potential aggressors can observe and target people or other assets in and around a building. Identify vantage points outside the control of personnel in the targeted building and either eliminate them or provide means to avoid exposure to them. Means to avoid exposure may include actions such as reorienting the building or shielding people or assets in and around the building using such measures as reflective glazing, walls, privacy fencing, or vegetation.

AP2.1.4. Recommendation 4. Drive-up / drop off. Locate these points away from large glazed areas of the building to minimize the potential for hazardous flying glass fragments in the event of an explosion. For example, the lane may be located at an outside corner of the building or otherwise away from the main entrance. The drive-up/drop-off point should be coordinated with the building geometry to minimize the possibility that explosive blast forces could be increased due to being trapped or otherwise concentrated. For further discussion of this issue refer to the DoD Security Engineering Manual.

AP2.1.5. Recommendation 5. Building location. Activities with large visitor populations provide opportunities for potential aggressors to get near buildings with minimal controls and therefore limit opportunities for early detection. Maximize separation distance between inhabited buildings and areas with large non-DoD visitor populations.

AP2.1.6. Recommendation 6. Railroad location. Avoid sites for inhabited buildings that are close to railroads. Where railroads are in the vicinity of existing buildings, standoff distances between the railroad and any inhabited buildings should be provided based on the standoff distances and explosive weight associated with controlled perimeters in Table AP1.1. Where those standoff distances are not available and since moving existing railroads may be difficult and prohibitively expensive, ensure that there are procedures in place to prohibit trains from stopping in the vicinity of inhabited structures.

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1 **AP2.1.7. Recommendation 7. Entry control points for family housing.** For new family
2 housing areas, provide space for an entry control point at the perimeter of the housing area so that a
3 controlled perimeter can be established there if the need arises in the future.
4

5 **AP2.2. ARCHITECTURAL DESIGN.** The following additional measures, if implemented, will
6 significantly enhance building occupants' safety and security with little increase in cost and should be
7 considered for all new and existing inhabited buildings.
8

9 **AP2.2.1. Recommendation 8. Internal circulation.** Design circulation within buildings to
10 provide visual detection and monitoring of unauthorized personnel approaching controlled areas or
11 occupied spaces.
12

13 **AP2.2.2. Recommendation 9. Visitor control.** Controlling visitor access points maximizes the
14 possibility of detecting potential threatening activities. Keep visitor control points in buildings away from
15 sensitive or critical areas, areas where high risk or mission critical personnel are located, or other areas
16 with large population densities of DoD personnel.
17

18 **AP2.2.3. Recommendation 10. Asset location.** To minimize exposure to direct blast effects
19 and potential impacts from hazardous glass fragments and other potential debris, locate critical assets and
20 mission critical or high risk personnel away from the building exterior.
21

22 **AP2.2.4. Recommendation 11. Room layout.** In rooms adjacent to the exterior of the building
23 position personnel and critical equipment to minimize exposure to direct blast effects and potential
24 impacts from hazardous glass fragments and other potential debris.
25

26 **AP2.2.5. Recommendation 12. External hallways.** Because doors can become hazardous
27 debris during explosive blast events, because doors designed to resist blast effects are expensive, and
28 because external hallways have large numbers of doors leading into inhabited areas, avoid exterior
29 hallway configurations for inhabited structures.
30

31 **AP2.2.6. Recommendation 13. Windows.** To minimize the potential for glazing hazards,
32 minimize the size and number of windows for new construction.
33

34 **AP2.2.7. Recommendation 14. Minimize secondary debris.** Eliminate unrevetted concrete
35 barriers and site furnishings in the vicinity of inhabited structures that are accessible to vehicle traffic.
36 Revet exposed concrete surfaces with 1 meter (3 feet) of soil to prevent fragmentation hazards in the
37 event of an explosion.

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AP3.1. STANDARDS. All the standards that are unique to expeditionary and temporary structures pertain to site planning. Operational, logistic, and security requirements must be integrated in the overall configuration of structures, equipment, landscaping, parking, roads, and other features. The most cost-effective solution to mitigating explosive effects on expeditionary and temporary structures is to keep explosives as far away as possible. This is especially critical for these types of structures because hardening may or may not be possible. Costs and requirements for expeditionary and temporary structure hardening are addressed in the DoD Security Engineering Manual.

AP3.1.1. Standard 1. Minimum Standoff Distances. The minimum standoff distances apply to all new and existing DoD expeditionary and temporary structures covered by these standards except as otherwise stated below. The minimum standoff distances are presented in Table AP3.1. Except as otherwise required in these standards, where the standoff distances in Table AP3.1 can be provided, conventional expeditionary and temporary structures may be used without a specific analysis of blast effects. Where those distances are not available, the structure must be analyzed and hardened as necessary (in those cases which permit structure hardening) to mitigate the effects of the explosives indicated in Table AP1.1 at the achievable standoff distance to the appropriate level of protection. The appropriate levels of protection for each structure category are shown in Table AP3.1 and are described in Table C2.3 and in the DoD Security Engineering Manual. The two structure types in Table AP3.1. respond in fundamentally different ways to explosive effects. Standoff distances in Table AP3.1 reflect those differences.

AP3.1.1.1. Controlled perimeter. The standoff distance will be measured from the closest point on the structure exterior to the controlled perimeter.

AP3.1.1.1.1. Fabric covered/metal frame construction and wood frame/rigid wall structures. Provide the standoff distance from Table AP3.1 for the applicable structure category.

AP3.1.1.1.2. Container structures. For these structures, apply the guidance in Appendix AP1.

AP3.1.1.2. Parking and roadways. Standoff distances for parking and roadways are based on the assumption that there is a controlled perimeter at which larger vehicle bombs will be detected and kept from entering the controlled perimeter. Where there is a controlled perimeter, the standoff distances and explosive weight associated with parking and roadways in Table AP3.1 apply unless otherwise stated below. If there is no controlled perimeter, it must be assumed that the larger explosive weights upon which the controlled perimeter standoff distances are based (explosive weight I from Table AP3.1.) can access parking and roadways near buildings. Therefore, where there is no controlled perimeter, standoff distances from parking and roadways will be in accordance with the distances and the explosive weight associated with controlled perimeters in Table AP3.1.

AP3.1.1.2.1. All Fabric covered/metal frame construction and wood frame/rigid wall structures. The standoff distance will be measured from the closest point on the structure exterior to the closest edge of parking areas and roadways. The minimum standoff for all structures regardless of hardening or analysis will be 10 meters (33 feet).

AP3.1.1.2.2. Existing Fabric covered/metal frame construction and wood frame/rigid wall structures. Moving existing parking areas and roadways may be difficult to achieve

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1 and structural retrofits to existing structures may be prohibitively expensive or technically impossible;
2 therefore, the following operational options are provided for existing inhabited structures where the
3 standoff distances in Table AP3.1 are impractical to achieve.

4
5 **AP3.1.1.2.2.1. Parking areas.** Establish entry control to portions of
6 parking areas to ensure unauthorized vehicles are not allowed closer than the required standoff distance.
7 For primary gathering structures and billeting if entry control is provided to prevent unauthorized parking
8 within the required standoff distance, controlled parking may be permitted as close as 10 meters (33 feet)
9 without hardening or analysis.

10 **AP3.1.1.2.2.2. Roadways.** Eliminate parking within the required
11 standoff distances along roads adjacent to existing structures covered by these standards.

12
13 **AP3.1.1.2.3. Container structures.** For these structures, apply the guidance in
14 Appendix AP1.

15
16 **AP3.1.1.3. Trash containers.** The standoff distance will be measured from the closest
17 point on the structure to the nearest point of the trash container or trash container enclosure. As a
18 mitigating measure where the standoff distance is not available, hardening of trash enclosures to mitigate
19 the direct blast effects of the explosive and the secondary fragment effects on the structure is acceptable if
20 the applicable level of protection can be proven by analysis.

21
22 **AP3.1.1.3.1. Fabric covered/metal frame construction and wood frame/rigid**
23 **wall construction.** Provide the standoff distance from Table AP3.1 for the applicable structure category.

24
25 **AP3.1.1.3.2. Container structures.** For these structures, apply the guidance in
26 Appendix AP1.

27
28 **AP3.1.2. Standard 2. Structure separation.** Structure separation requirements are established
29 to minimize the possibility that an attack on one structure causes injuries or fatalities in adjacent
30 structures. The separation distance is predicated on the potential use of indirect fire weapons.

31
32 **AP3.1.2.1. Billeting and primary gathering structures.**

33
34 **AP3.1.2.1.1. Fabric covered/metal frame construction and wood frame/rigid**
35 **wall construction.** For all new billeting and primary gathering structures ensure that adjacent structures
36 are separated by at least the distances in Table AP3.1. Where it is necessary to encroach on those
37 structure separations, analyze the structure and provide hardened structure components as necessary to
38 mitigate the effects of the explosive indicated in Table AP3.1 to the appropriate level of protection as
39 shown in Table AP3.1 and described in Table C1.3 and in the DoD Security Engineering Manual.

40
41 **AP3.1.2.1.2. Container structures.** For these structures, apply the guidance in
42 Appendix AP1.

43
44 **AP3.1.2.2. Other inhabited buildings.** There are no minimum separation distances
45 required for antiterrorism for inhabited buildings.

46
47 **AP3.1.3. Standard 3. Unobstructed space.** Keep areas within 10 meters (33 feet) of all
48 expeditionary and temporary structures free of items other than those that are part of the infrastructure.

49
Table AP3.1 Removed
FOUO Information was Removed from this Table.

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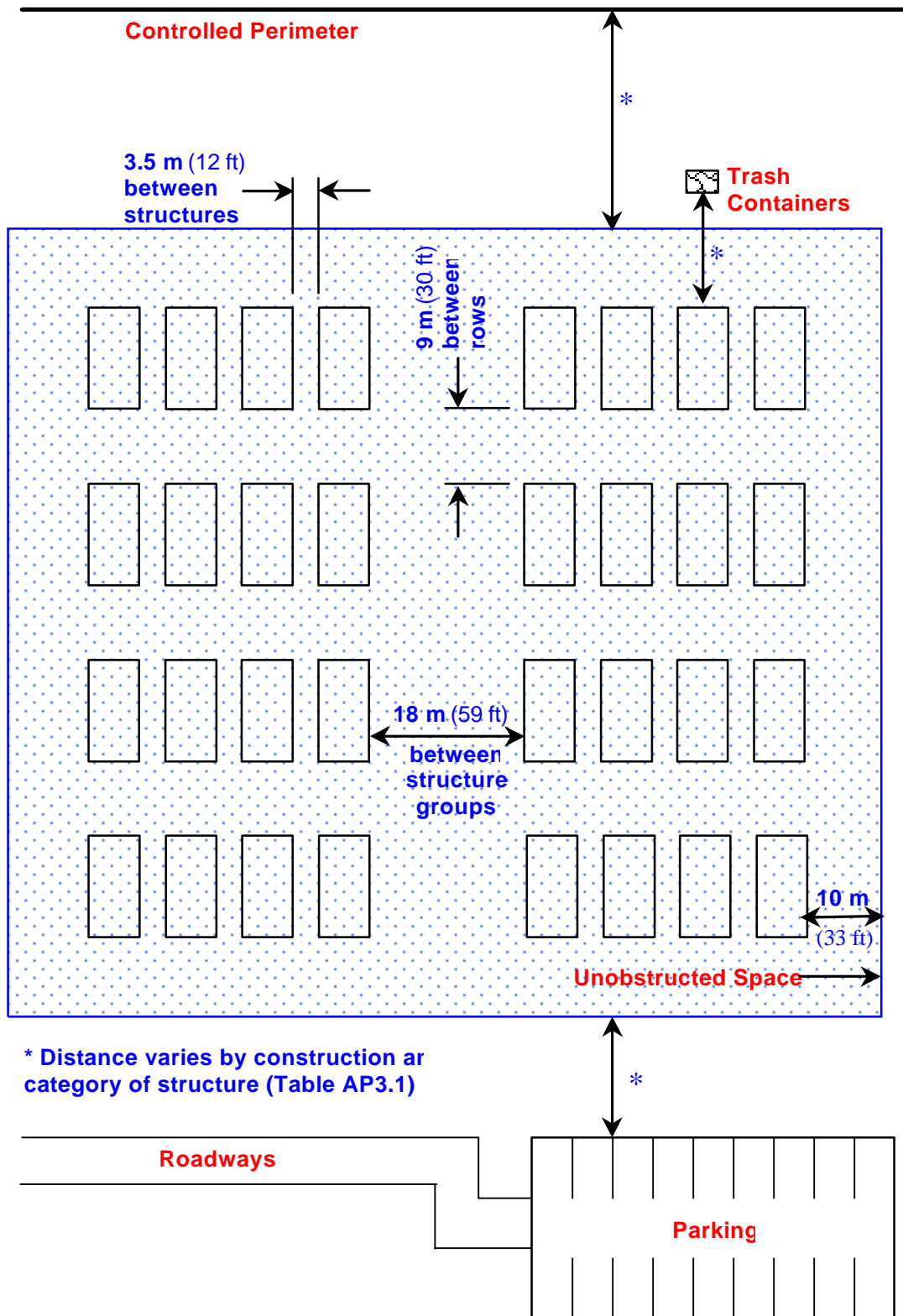


Figure AP3.1. Standoff Distances and Structure Separation for Expeditionary Structures

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1 **AP3.1.4. Additional standards.** In addition to the specific standards detailed in this appendix,
2 standards from Appendix AP1 shall apply to expeditionary and temporary structures as follows:
3

4 **AP3.1.4.1. Fabric covered/metal frame construction and wood frame/rigid wall**
5 **construction.** The following standards from Appendix AP1 shall be applied to these structures:
6

7 **AP3.1.4.1.1. Standard 4. Drive-up/drop off and access roads**
8

9 **AP3.1.4.1.2. Standard 10. Windows and glazed doors**
10

11 **AP3.1.4.1.3. Standard 11. Building entrance layout**
12

13 **AP3.1.4.1.4. Standard 19, Equipment bracing**
14

15 **AP3.1.4.1.5. Standard 18. Mass notification.**
16

17 **AP3.1.4.2. Container structures.** For these structures, all standards in
18 Appendix AP1 apply.
19

20 **AP3.3. ANTITERRORISM RECOMMENDATIONS.** All recommendations except for
21 Recommendation 7 (Entry Control Points for Family Housing) from Appendix AP2 should be applied to
22 expeditionary and temporary structures.

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ATTACHMENT No. 7

METRIC DESIGN GUIDE (MDG)

NOTE: The first three pages of this attachment list criteria that have superceded specific criteria listed in the MDG. Where applicable, use the new criteria found on these three pages.

c. The metrication process for products involves "soft metric conversion" and "hard metric conversion". Dimensions for the vast majority of construction products need only be "soft-converted" for use in metric construction projects. A soft metric conversion means that the physical dimensions of the product remain unchanged while the measurement units used to describe and specify the product are changed to metric units. To make metric construction succeed, a small percentage of products need their physical dimensions changed or "hard-converted" to fit them into the internationally recognized building module of 100 millimeters (mm). These products are frequently referred to as modular products or hard metric products.

Modular construction products are brick, CMU (also known as concrete block) components of the suspended ceiling systems such as acoustical ceiling tiles, recessed lighting fixtures (RLF) and air diffusers, raised access flooring, wallboard, plywood, particleboard, and rigid insulation. According to the guidelines in reference 1.a., a modular construction product in a hard metric size shall only be specified in a Federal construction project if the product's application requires it to "dimensionally coordinate" into 100 mm building module, the product is found to be competitively available, and the product's total installed cost is reasonable. Total installed cost is the cost of purchasing and installing the product including all cutting/trimming necessary to fit them with other building components in a 100 mm building module. Use of modular products avoids unnecessary jobsite cutting or trimming fostering cost-effective, logical design and quality construction.

4. GUIDELINES FOR SOME SPECIFIC MODULAR CONSTRUCTION PRODUCTS.

a. **Steel Reinforcing Bar.** The actual diameter size of steel reinforcing bar is not required to change in order to coordinate dimensionally into the 100 mm building module. Therefore, the American Society for Testing and Materials (ASTM) has recently adopted new metric bar standards which are based on soft conversion of existing inch-pound bars.

b. **Brick.** Many common brick sizes are within a millimeter or two of metric modular sizes and nearly all can fit within 100 mm module by slightly varying mortar joint widths to 10 mm.

c. **Concrete Masonry Units (CMU).** The new legislation which becomes effective 10 January 1997 (reference 1b) allows federal agencies to specify only hard metric versions of CMU unless (1) the block will be required to fit together into the 100 mm building module, and (2) the "agency head" determined (prior to contract award)

that the total installed price of hard-metric CMU is estimated to be equal to or less than the total installed price of using inch-pound (soft metric) CMU. To comply with the new law, the majority of the Federal agencies including USACE, elected to let the construction contractor use either metric or substitute inch-pound blocks in our metric projects without compromising design requirements. Construction documents for bids or proposals, issued after 10 Jan 97, will incorporate this policy. It is the general contractor, not the government, who will make the decision whether metric or inch-pound concrete block offers the most efficient and cost-effective solution in each situation. If the general contractor decides to use inch-pound CMU, the following provisions should be met so that quality is not jeopardized: (1) mortar joint width should be no less than 10 mm, (2) horizontal reinforcements, if required, should be placed between the joints only, (3) no cut block should be put at the end of wall, and (4) if the vertical reinforcement and the masonry block webs do not match, the block must be cut to adjust, rebars will not be cut, bent or eliminated to correct the condition.

d. Suspended Ceiling Systems. Components for suspended ceiling systems are T-bars, hangers, ceiling tile, recessed lighting fixtures (RLF), and recessed air diffusers. All components are available in modular metric sizes and are priced competitively with their inch-pound counterparts with the exception of recessed lighting fixtures. In this case also, for compliance with the above mentioned law, USACE and other Federal agencies elected to let the construction contractor make the decision whether metric or inch-pound recessed lighting fixtures should be used. Construction documents for bids or proposals, issued after 10 January 1997, will incorporate this policy. If the general contractor decides to use inch-pound RLF, he will be allowed to use substitute inch-pound products for all suspended ceiling components provided they do not interfere with other design requirements.

e. Raised Access Flooring. Raised access flooring is a specialty item used primarily in computer rooms and other areas where provision for under floor cabling is desirable. A number of manufacturers make raised access flooring to fit the 100 mm module, but there may be a cost premium for small orders and longer delivery times for most orders. Metric raised access flooring will be specified if costs are comparable to inch-pound access flooring and procurement lead times are acceptable.

f. Wallboard. Wallboard is formed in continuous sheets of variable widths and cut to specified lengths. A variety of manufacturers make wallboard to fit the 100 mm module, but there may also be a cost premium for small orders and longer delivery times for most orders. While the use of metric wallboard is desirable in metric projects, its use is not mandatory on small projects or small orders if project duration or cost will

increase. Where framing spacing is specified to fit modular metric construction, the contractor should not be allowed to cut or trim the sealed edges of inch-pound (soft metric) wallboard sheets to fit into the metric frame spacing.

g. Plywood and Particleboard. Like wallboard, wood-based sheet products such as plywood and particleboard can be produced in modular metric sizes. There may be a premium for small orders and longer delivery times for most orders. When framing spacing is specified to fit modular metric construction, the construction contractor may make the decision whether metric sheets or trimmed inch-pound sheets offer the most efficient and cost-effective solution in each situation.

h. Rigid Insulation. Rigid insulation is used on exterior walls and as a roof underlay. Currently, this product is available only in inch-pound sizes and must be cut to fit metric framing spacing. On roofs, the product is usually laid over a rigid substrate that allows any sheet size to be used. Where the sheets are applied directly to metric framing spacing (400 or 600 mm), the width must be trimmed by the contractor.

5. ADDITIONAL GUIDANCE AND INFORMATION ON METRICATION.

a. Further guidance on the federal acquisition of modular metric construction products is available from the Construction Metrication Council of the National Institute of Building Sciences, 1201 L Street, N.W., Suite 400, Washington D.C. 20005, Tel. 202-289-7800. The Construction Metrication Council issues a bimonthly newsletter, *Metric in Construction* which provides private and public support for the metrication of Federal construction and promotes the adoption and use of the metric system of measurement.

b. HQUSACE Architectural *Gargoyle* is an informal publication that is issued by CEMP-A. This publication provides information and news of interest about metrication along with other hot topics. *Gargoyle* can be found on CEMP-A web site at URL http://www.hq.usace.army.mil/cemp/e/a/cemp_ea.htm.

c. If you have any questions regarding metrication you should first contact your district metric point-of-contact (POC). If you do not know who your metric POC is, contact your district architectural POC. The list of architectural POC can be accessed from the CEMP-A web site. Quite often the district metric POC and the architectural POC are the same individual. The metric or architectural POC will be able to assist you in obtaining the answer.

d. Request for additional guidance or information concerning metrication should be

METRIC DESIGN GUIDE

(PBS-PQ260)

September 1995

**Public Buildings Service
U.S. General Services Administration**

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General Information

Introduction

Pub. L. 100-418 designated the metric system as the *preferred* system of weights and measures for U.S. trade and commerce. This law also directed all Federal procurement, grants, and other business-related activities to be metric by September 1992, unless this was impractical or likely to cause loss of markets to U.S. firms. Presidential Executive Order 12770, July 29, 1991, designated the Secretary of Commerce to direct and coordinate metric conversion efforts by all Federal departments and agencies, and authorized the development of specific dates for metric conversion in industries where September 1992 was impractical.

Executive Order 12770 also authorized the Secretary to create an Interagency Council on Metric Policy (ICMP) to assist the effort. The ICMP established 10 working subcommittees, each responsible for the conversion of Federal procurement in a major industry. The Construction Subcommittee was established to oversee metric conversion in the Federal construction industry.

In industries where a September 1992 conversion deadline was not feasible, the Executive order authorized a department or agency to consult the Secretary of Commerce to establish a more feasible date. The Construction Subcommittee evaluated the construction industry and proposed an alternate conversion date of January 1, 1994. This date allowed time to revise standards after some experience with pilot projects. The Subcommittee requested this time because, in the spirit of the law, it was going to propose using as many modular *hard*-dimension products as are made at any given time.

The General Services Administration (GSA) order, GSA Metric Program (ADM 8000.1B), dated November 11, 1992, required that all procurement be in the metric system of measurement by October 1992 or waivers be issued, supported by an assessment. This order established the alternative date of January 1, 1994, for construction.

Cooperation between Government and the private sector has been vigorously pursued as required by the Executive order. The Construction Subcommittee established a Construction Metrication Council in the National Institute of Building Sciences. The meetings of the Construction Metrication Council are attended by Federal agencies involved in construction, professional societies, trade organizations, product manufacturers, labor representatives, code organizations, and design firms. Attendance at the Council is extended to other parties interested in monitoring and assisting the metric conversion of the Federal construction community.

All GSA designs for renovation and new construction started after January 1, 1994, are being done in the metric system. Most Federal agencies involved in construction have already committed significant projects to be designed and built in metric.

Many private firms and governmental agencies involved with international construction have provided input and feedback to the material presented here. This document was coordinated with available private sector and professional society metric design guidance. Whenever possible, existing guidance has simply been adopted. Where private guidance did not exist, the most feasible direction has been developed and presented.

There are several "metric" systems in use in the world. The U.S. Government has adopted the International System of Units, abbreviated SI, from the French *Système international d'unités*. SI is used by major professional and code organizations.

An objective of the development of this document has been to minimize the impact on design firms, contractors, and product manufacturers, while still complying with the national directive of increasing U.S. competitiveness.

Due to the developmental nature of metric design in the United States, it is probable that this document will be updated occasionally to incorporate new metric design information and metric product manufacturers.

Benefits Of Metric

International Acceptance

U.S. industrial firms have sometimes been excluded from dealing in international markets because they are unable to deliver goods measured in metric terms. Others are increasingly unwilling to overcome this hurdle to utilize our products. U.S. firms in many cases then have to produce two sizes of a particular product.

U.S. firms will enjoy enhanced export potential by conducting business in the international language of measurement. Many companies have taken the initiative to understand foreign markets and become fluent in metric.

Simplicity

Metric is decimal-based, and therefore simpler and faster to use. Trying to multiply 27 feet, 8-5/8 inches, by 32 feet, 6 -7/16 inches, to obtain area demonstrates the complexity of our current system. English dimensions have to be converted to be added or multiplied, while metric ones do not.

The Canadian Construction Association reports that metric produced direct benefits, in terms of reductions in design costs and time, increased efficiencies in construction operations, and improved material and component dimensioning techniques, when commercial construction in Canada switched to the metric system years ago.

The U.S. Government in its own operations could expect the same advantages as stated in Pub. L. 100 -418.

Product Variations

Many organizations and some businesses have viewed metric conversion as an opportunity, and simultaneously selected fewer standard product sizes, reducing inventories and required manufacturing equipment. This opportunity exists with us as well.

One Unit For Each Property

The metric system simplifies building engineering by using only one unit for each physical property. Examples:

Pressure. While the English system has pounds per square inch (psi), pounds per square foot (psf), tons per square foot (tons/SF), inches of water (inH₂O), inches of mercury (inHg), and kips/SF, the SI metric system has only one pressure unit, the pascal (Pa). If more than 1 000 Pa are present, the kilopascal (kPa) is used. If more than 1 000 000 Pa, the Megapascal (MPa).

Power. The English system has watts (W), British thermal units (Btu's), horsepower (hp), tons, boiler hp, and other units. SI uses only W, kilowatts (kW), or milliwatts (mW), depending on the size of the number. An example of metric simplicity:

If an additional light fixture produces 600 W of heat, how many additional Btu's of cooling are needed to prevent a room temperature rise? Exactly how much will this add to system requirements? This must be calculated when using English units.

In SI, all thermal power units are measured in W.

The fixture produces 600 W, so the net system capacity must increase by 600 W.

Standards

See *Standard for Metric Practice* (ASTM E380), *SI Guide for HVAC & R* (ASHRAE), and *Handbook of Fundamentals* (ASHRAE) for accepted units and conversion tables.

Summary

The American construction community is able to meet the metric conversion challenge in Federal construction, and it is in our long-term strategic interest to do so. There will be some initial effort involved, but close cooperation between the public and private sector will allow the goals to be successfully met.

Metric Project Definition

A project is "metric" when:

- Specifications show SI units only.
- Drawings show SI units only.
- Construction takes place in SI units only.
- Inspection occurs in SI units only.

This does not imply that building products change. Over 95 percent of the products used in building construction today will undergo no physical change in metric construction. Dimensions of products will be identified in drawings, specifications, and product literature in metric units. These products will be spaced or cut in the factory or field to round metric dimensions

There are a few *products* that can be purchased in a slightly different size in order to be efficiently used in metric construction. This is generally called *hard* conversion. GSA will call all products round-numbered products whether they are manufactured in a different size or cut to size later. Spacing of materials such as stud spacing or floor-to-floor height or field-cutting materials to length should never be considered *hard* but merely round numbers. As international standards are developed, other products may be manufactured in round sizes to enhance their market potential.

Dual Dimensions

Dual-dimensioning is a wasted effort. When English measurements are present, U.S. readers will use them and ignore the metric measurement. A project that is round in one measurement system will be unround in the other, and therefore more difficult to design and particularly build in the other system.

Summary

It is important that drawings and specifications be metric exclusively. Most dimensions, particularly linear ones, should be round to avoid seriously impacting the largest cost component of a construction project, which is field labor.

Round Metric Dimensions

Over 95 percent of currently used building products will not be sized differently in metric construction. Product literature and engineering data on these products should be requested with metric dimensions.

Product literature may contain both metric and English dimensions. Since product literature costs can be substantial, firms without metric product literature need only develop a supplement to their existing literature. Supplements will be accepted as submittals for an interim period.

In the future, as standard international metric product sizes are developed by the International Standards Organization (ISO) or another standards organization, more products may undergo modification to be compatible in the world market.

Listed below are examples of standard products that can be utilized on a metric project today.

Architectural

- Carpeting.
- Door hardware.
- Elevators and escalators.
- Filing and shelving units.
- Kitchen equipment.
- Landscaping products.
- Lavatory units.
- Paint products.
- Resilient base.
- Revolving entrance doors.
- Roofing membranes.
- Systems furniture.
- Toilets.
- Toilet partitions.
- Vertical blinds.

Civil

- Caisson forms.
- Reinforced concrete pipe.

Structural

- Steel deck.
- Structural steel shapes.

Mechanical

- Air handling units.
- Boilers.
- Chillers.
- Fan coil units.
- Pumps of any type.
- Heating, ventilating, and air-conditioning (HVAC) control systems.
- Pipe.
- Plumbing fixtures.
- Pumps.
- Valves.

Electrical

- Cable trays.
- Conduit.
- Copper wire sizes (eventually metric sizes may be used).
- Fiber optic cables.
- Fire alarm systems and components.
- Junction boxes.
- Motors.
- Panelboards.
- Receptacles.
- Switches.
- Switchgear.
- Transformers.
- Underfloor duct systems.
- UPS systems.

Custom Products

Custom products may be specified in any size. These products are made to fit a specific project in any measurement system and may therefore be specified in round metric sizes. Specific firms which are able to make these products are listed later in this document. Examples:

- Aluminum curtainwall systems.
- Wood doors.
- Glass.
- Interior stonework.
- Precast facade systems.
- Metal ductwork.
- Windows.

Not all dimensions of custom products will change. For example, while the length and width of curtainwall panels can be specified in round metric sizes, the cross-section of the extrusion does not need to change for construction. The dimensions of the cross-section can be a mathematical conversion or any number the industry decides to name the product. This also applies to window systems or ceiling grid systems where length and width or height are critical and the section dimensions are not.

Modular Products

Modular products may be slightly different sizes in metric projects. The size of the product has been modified in order to be efficiently utilized in a metric project. A handful of currently used building products may undergo *hard* conversion to fit a round metric project.

Examples of products that may be physically changed:

- Suspended ceiling tiles and grids.
- Fluorescent lighting fixtures (lay -in type only).
- Air diffusers and grilles (lay -in type only).
- Brick and CMU (see *Architectural/Masonry* for contractor options).
- Drywall. (see *Architectural/General* section for contractor options).
- Raised access flooring.

Drawings

SI drawings preferably use only millimeters (mm) to avoid fractions and to eliminate the repetitious suffix. The following note on drawings will avoid confusion: "ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED."

Decimal mm (such as: 2 034.5) are not required on SI drawings unless a high precision part or product thickness is being detailed. A whole number such as: 2 035 is adequate.

Dual dimensions should not be used.

Shop drawings or catalog data using the same dimensions as on contract documents will avoid errors in translation.

Space Between Groups . A space separating groups of three digits on drawing dimensions will allow faster and more accurate dimensional interpretation.

Example: A 20 meter dimension can be shown as 20 000.

Scales. American Institute of Architects (AIA) preferred metric scales, all multiples of 1, 2, or 5. See *Graphic Standards* for other scale information.

<u>Metric</u>	<u>Current</u>
1:2	1:2
1:5	3"-1'
1:10	-1/2"-1', 1"-1'
1:20	3/4"-1', 1/2"-1'
1:50	1/4"-1'
1:100	1/8"-1'
1:200	1/16"-1', 1"-20'
1:500	1/32"-1', 1"-40', 1"-50'
1:1 000	1"-80', 1"-100'

Sheet Sizes . While there are standard SI drawing sizes, any size may be used until new ones are issued through the usual supply process.

Specifications

Millimeters (mm)

SI specifications have used mm for almost all measurements, even large ones. Use of mm is consistent with dimensions in major codes, such as the National Building Code (Building Officials and Code Administrators International, Inc.) and the National Electric Code (National Fire Protection Association).

Use of mm leads to integers for all building dimensions and nearly all building product dimensions, so use of the decimal point is almost completely eliminated. Even if some large dimensions seem to have many digits there still will usually be fewer pencil or CAD strokes than conventional English Dimensioning

Meters (m)

Meters have been used where large, round metric sizes are meant or where it is already customary, such as in surveying.

Example: "Contractor will be provided an area of 5 by 20 meters for storage of materials."

Centimeters (cm)

Centimeters are typically not used in U.S. specifications. This is consistent with the recommendations of AIA and the American Society of Testing Materials (ASTM). Centimeters are not used in major codes.

Use of centimeters leads to extensive usage of decimal points and confusion to new readers. Whole millimeters are being used for specification measurements, unless extreme precision is being indicated. A credit card is about 1 mm thick.

Example 1 - Mortar Joint Thickness . If a 3/8-inch mortar joint between brick is needed, this would convert to 9.525 mm. Whole mm are used. Specify 10 mm joint thickness.

Example 2 - Stainless Steel Thickness . Bath accessories are commonly made from 22-gage (0.034-inch) thick stainless steel. Exact conversion is 0.8636 mm. This is

a precision measurement. However, since gage is a name and not a dimension, it is acceptable to use 22-gage on metric drawings and specifications until an industry converts sizes.

Rounding and Conversion

Simple Mathematical Rounding . This leads to many problems. An example is to take an existing criteria dimension, such as 12 feet, convert it mathematically to 3 658 mm, and use this dimension. Builders, faced with entire drawing sets of awkward, nonrounded numbers, will find that metric is more difficult. In projects to date, a number of builders converted back to be able to measure with English tapes. They also made conversion mistakes, causing rebuilding and delay. It is very important to make job site labor more efficient by professionally rounding dimensions.

Professional Rounding . This technique takes the result of simple mathematical rounding, and applies professional judgment. The basic module of metric design is 100 mm.

Following are two examples of professional judgment in rounding design criteria that have already been included in GSA metric criteria in the *Facilities Standards for the Public Buildings Service (PBS-PQ100.1)* :

Example 1: Conversion of a code requirement.

Step 1. Determine the nonoffending direction.

1993 National Building Code Article 1011.3 requires 44 inches (1 118 mm) of unobstructed pedestrian corridor width. However, 1 118 mm is not a round number. It should be rounded to facilitate the cleanest construction possible. Narrower doesn't meet the code. The nonoffending direction is larger.

Step 2. Select the largest feasible module.

- 1 200 mm is feasible, so this represents a choice however GSA corridors are usually above code minimums. 1 500 may be more like current usage.
- Every effort should be made to keep design dimensions in increments of 100 mm.

In each case, the user must determine the acceptable choice, but the user is encouraged to present clean, rounded metric dimensions as alternatives. Simple mathematically converted dimensions will lead to an increase in project cost and time.

Example 2: Conversion of an existing design practice.

Professional rounding used when converting conventional design dimensions.

Ceiling Height. A common office ceiling height is 9 feet. Simple mathematical conversion yields 2 743 mm. This is an awkward dimension and can decrease productivity in use. Since this is above code requirements, there is no close minimum requirement.

Step 1. Determine the metric design tolerance.

If, instead of 9 feet, the installed height varies by a few inches, the visual and technical requirements will still be met and cannot be detected by casual observation. This variation in actual height becomes a "design tolerance." The selection of design tolerance is a professional judgment.

Step 2. Determine the acceptable design range.

A range is a simple mathematical conversion, such as 2 743, plus and minus 50 mm. Acceptable design range becomes 2 693 to 2 793.

Step 3. Select a preferred dimension.

2 700 and 2 800 are within an acceptable design range. 2 700 will cost less than 2 800 and is usually given first priority.

Example: Some roof flashing systems require fasteners at a minimum 24 inches on center, which mathematically converts to 609.6 mm. More fasteners would probably be acceptable at a slight increase in material cost. Selection of equivalent distance yields 600, which will be easier to install.

Architectural/General

Module

New GSA office building construction should use a 600 mm planning module. This is the closest to the common 24-inch module and products are made this size. See page 3-19 of the metric version of PBS-PQ100.1

Drywall

Major drywall manufacturers currently offer round metric sizes in minimum order quantities. Only sheet length and width are classified in round metric. Standard sheet width is 1 200 mm. Lengths are available in 2 400 mm and several longer sizes. Thicknesses remain the same to minimize code impact. Standard thicknesses are 12.7 mm and 15.9 mm. Some architects are showing these as 13 and 16mm on drawings. Standard stud spacing is 400 mm, as it is the closest to 16 inches and is an even multiple of the sheet size. If drywall is installed horizontally across studs then the contractor could purchase drywall with the vertical dimension in a converted English size so only the length is round metric. This may widen the availability in smaller purchases.

Since a minimum order quantity can be significant, its use must be evaluated for each project. Currently this may be as high as a truckload, or about 700, of 1 200 by 2 400 sheets.) If minimum quantities will not be satisfied, then English-size drywall as shown above can be used and cut even though the project is metric, as is done in Canada. *These decisions can be left to the marketplace to determine by specifying stud spacing and drywall thickness but not length and width.*

Doors

A common metric door size is 900 by 2 100 mm. This may be used on metric projects where other project specific design criteria are satisfied. Door thicknesses will remain the same, being identified by the nominal mm equivalent such as 45. A 950 by 2 150 door size is used in Canada as it matches metric block coursing.

Ceiling Systems

Manufacturers make round-metric-size tiles and grids for use in metric projects. The most common sizes are 600 by 600, and 600 by 1 200 mm.

Architectural/Masonry

Masonry walls have a critical wall thickness for fire resistance and compressive strength. They also are never relocated after construction. Beyond this, it is not important what dimension the height and width of a masonry unit is except for appearance, ability to accommodate metric window and door openings, having even coursing for ties and round dimensions between openings for ease of builder measurement, and weight of the unit for lifting. Project requirements then should be limited to these factors, with total competitive pricing determining the dimensioning. It should be noted that there are a number of proprietary, nonmortar joint, concrete block systems using English measurements, with builder labor advantages, that also require a local manufacturer to have different molds for concrete masonry units, as do metric units.

Brick

The "metric modular brick" is the most common. Its size is 90 by 57 by 190 mm (3-9/16 by 2-1/4 by 7-1/2 inches). American modular brick is:

- 3-5/8 by 2-1/4 by 7-5/8 inches (92 by 57 by 194 mm) when 3/8-inch joint is used.
- 3-1/2 by 2-3/16 by 7-1/2 inches (89 by 56 by 190 mm) when 1/2-inch joint is used.

The standard American modular brick used with a 1/2-inch joint is so close to the metric modular brick that it can be used with only a slight variation in joint thickness during field installation. Three vertical courses of metric modular brick with 10 mm joints equals 201 mm, which is rounded to 200.

Other sizes of metric brick are identified in *Graphic Standards*.

Block

A standard American "8-inch" block is 194 by 194 by 397 mm for use with mortar joints. A nonmortar joint stacking block is usually 203 by 203 by 406 mm. GSA has used 190 by 190 by 390 mm metric blocks on some projects, which is the size that companies shown in the *Product Information* section responded to. The National Concrete Masonry Association may set a size standard in the future.

Architectural/Sheet Metal

Most specification references use gage number followed by the decimal inch thickness.

Example: 22 gage (0.034 inch).

Use current standard sheet thicknesses. Show only the gage number on metric documents until a metric standard is developed.

Example of usage: Provide grab bar with a minimum wall thickness of 18 gage (0.051 inch). Replace with: Provide grab bar with minimum wall thickness of 18 gage.

Civil/Surveying

The two primary Federal agencies involved in the production of survey information for public use are the National Geodetic Survey (NGS) and the U.S. Geological Survey (USGS). The databases for these two agencies are metric.

NGS, which maintains a database of hundreds of thousands of horizontal and vertical survey control points on which U.S. surveys are based, has been metric since 1983. USGS, which produces topographic maps of terrain elevations, has digitally mapped the U.S. surface. The ground distance between each pair of digitized points is 30 meters. Survey and mapping data necessary to do metric design and construction in the United States are available. Most states have adopted metric in their state plane coordinate systems.

The following information has been used on site plans and topographic maps.

Contour intervals utilize either 1.000, 0.500, or 0.250 m as contour intervals, depending on site slope.

Elevation measurements are given in m.

Benchmark elevations are converted from feet to m.

Examples:

Benchmark is 314.15 feet. Convert to 9 5.753m.

Sample Contour Lines:

———— 106. 0 ————
———— 105. 5 ————

Civil/Concrete

Concrete strength is specified in MPa. The following strengths, which are used in Canada, may be used in metric construction. It is a good practice to use round numbers so that additional accuracy over English designations is not implied. The general purpose concrete strengths are reduced from six strengths to four strengths. Strengths above 35 MPa can be specified in 5 MPa intervals (40, 45, 50, 55, etc.). ACI 318 M, which is the metric version, is now used as a standard.

<i>Previous psi</i>	<i>Conversion MPa</i>	<i>Exact Specify MPa</i>	
2 500	17.23	20	
3 000		20.67	20 or 25 (See note)
below)			
3 500	24.12	25	
4 000	27.56	30	
4 500	31.01	35	
5 000	34.45	35	

Note: If code requires 3 000 psi, then 25 MPa must be used; otherwise, it is a professional judgment on 20 or 25.

Civil/Reinforcement

Metric projects have used ASTM A615M reinforcing bars for general purpose applications. The M after A615 indicates a metric specification. A615M reinforcing bar comes in Grades 300 and 400, indicating 300 and 400 MPa yield strength.

There are 8 bar sizes, which replace the 11 English bar sizes. The Concrete Reinforcing Steel Institute (CRSI) is requesting that ASTM develop a new metric standard as the existing one uses bar numbers that are neither the bar diameter nor the overall diameter. The existing metric standard is merely different, it was never a true *hard* dimensioned product. Project managers are advised to check with the State Department of Transportation in their area to see what they are currently specifying as highways use proportionally more of this product than buildings.

While many firms can make metric rebar, and there are fewer sizes to evaluate and install, minimum order quantities apply. Canadians add M after each bar size to avoid confusion with larger English sizes.

<i>Nominal Diameter (mm)</i>	<i>Actual Diameter (mm)</i>	<i>Cross- Section Area (mm)</i>
10	11.3	100
15	16.0	200
20	19.5	300
25	25.2	500
30	29.9	700
35	35.7	1 000
45	43.7	1 500
55	56.4	2 500

Some applications may need A616M, A617M, A706M, or A775M.

Structural/General

There are three world steel shape standards:

- ASTM A6/A6M (American).
- Japanese Industrial Standard (JIS).
- *Deutsches Institut fuer Normung (DIN)* (German).

A fourth is the BI, or British Imperial. None is dominant worldwide, but each is used extensively. There is no international standard issued by ISO, the official international group that develops worldwide standards.

An ISO standard is currently undergoing development, and will probably involve selection of shapes from the three primary world standards, coupled with elimination of redundant shapes.

Metric Projects

Since no international trend exists on standardization of steel shapes, the American Institute of Steel Construction (AISC) recommends that metric projects use the same steel shapes currently used, but use the metric dimensions listed in ASTM A6/A6M. A6/A6M lists both inch and mm dimensions of shapes. All load and resistance factor design (LRFD) property, shape, and specification design data are available in metric from AISC for A6/A6M steel shapes. (Phone orders: AISC, Chicago, IL, 312-670-5414.)

Structural calculations done in metric are easier to review and have a lower probability of error.

Fasteners

ASTM A325M and A490M are standards for structural metric bolts. There are seven standard metric bolt sizes, which replace the nine bolts currently used. Standard sizes are 16, 20, 22, 24, 27, 30, and 36 mm. Many manufactured products now use metric fasteners either in part or for all of a product. There are hundreds of firms making metric fasteners, screws, and bolts

Structural/Floorload

Calculations are in kPa, but floorloading can be in kilograms (kg) per square meter because many dead and live loads are given in kg.

The following chart gives kPa strength ratings that can be used to replace the psf strength rating and not imply a greater accuracy:

<i>Previous (psf)</i>	<i>New (kPa)</i>	<i>Percent Stronger</i>
50	2.5	4.4
80	4	1.8*
100	5	4.4
120	6	4.4
150	7.5	4.4
200	10	4.4
250	12	0.2
300	15	4.4
350	17	1.4
400	20	4.4
450	22	2.1
500	24	0.2

*GSA office floor standard , *PBS-PQ100.1* .

Mechanical/General

Temperature

Celsius is used for temperature designations in new or modernization building projects. Renovation projects where the entire mechanical system is not to be changed may retain Fahrenheit.

All major manufacturers of HVAC control systems offer products in Celsius.

Air Distribution

Many manufacturers of diffusers and registers indicate they currently offer sizes to fit a round metric ceiling grid.

Ductwork

Rectangular metal ductwork is a custom-made product. Typically, English-dimensioned ductwork is only shown to the nearest 2-inch increment. Round metric sizes are easier to measure (*example*: 300 by 600 mm) on a metric project. Prefabricated flexible round duct is specified in converted sizes.

Units. See the ASHRAE SI Guide.

Mechanical/Pipe

Steel pipe and copper tube sizes will not now change. American sizes are used in many parts of the world and should be designated by nominal mm size. *Hard* metric pipe size may be used in the future. ASTM B88M, which gives standard hard metric copper tube sizes, will not be used until ample product availability can be established.

During transition to metric the following should be on at least the mechanical first sheet:

"ALL SIZES ARE INDUSTRY STANDARD ASTM A53 PIPE AND ASTM B88 TUBE DESIGNATED BY THEIR NOMINAL MILLIMETER (mm) DIAMETER EQUIVALENT. SEE CHART BELOW."

<u>Nominal Size</u>	
<u>Inch</u>	<u>mm</u>
1/2	15
3/4	20
1	25
1-1/4	32
1-1/2	40
2	50
2-1/2	65
3	80
3-1/2	90
4	100
5	125
6	150
8	200
10	250
12	300

Electrical/General

Conduit will not now change size in metric. It will be classified by a nominal mm size. During transition to metric the following should be placed on at least the first electrical sheet. These are NEMA standards.

"ALL CONDUIT SIZES ARE INDUSTRY STANDARD ENGLISH SIZE CONDUIT DESIGNATED BY THEIR ROUNDED NOMINAL MILLIMETER (mm) DIAMETER EQUIVALENT. SEE CHART BELOW."

<i>Nominal Size</i>	
<i>Inch</i>	<i>mm</i>
1/2	16
3/4	21
1	27
1-1/4	35
1-1/2	41
2	53
2-1/2	63
3	78
3-1/2	91
4	103
5	129
6	155

Wire Size

Use AWG or MCM until availability of wire manufactured to ASTM B682, standard metric conductor sizes, is determined. Round metric sizes per the above standard are substantially larger than round English sizes in secondary circuit use. Fiber optic cables are already metric.

Lighting Fixtures

Round metric lay-in type fixture sizes are used when using a round-metric-sized ceiling grid. Many domestic manufacturers currently manufacture or can produce round metric sizes of 600 by 600 mm and 600 by 1 200 mm. The 600 by 600 mm size with sockets on one end is easier to manufacture in metric and may have more competition.

See PBS-PQ100.1 for GSA criteria for general ceiling lighting, including life-cycle cost requirements. Caution must be used to not take an older design and merely round off fixture dimensions or spacing because new energy requirements may substantially change a lighting layout from previous ones.

American manufacturers have produced metric fixtures either by modifying existing production machinery or they already had machinery that was specifically made for the metric market. To date, metric fixtures are being sold, in building quantities, at the same price as English sized fixtures.

Some manufacturers, even those who have competitively sold metric fixtures, claim that their costs are higher for metric production. Sources and costs of these products should be checked before requesting a project bid or proposal. Spare building fixtures for *Property Management* replacements beyond the *Initial Space Alteration* should also be considered to extend the time required before small purchases are needed.

Product Information

This directory lists domestic manufacturers of commercial building products in one of the following classes:

- Manufacturers who make products that will not change size during metric conversion, but have developed product literature with metric dimensions in it.
- Manufacturers who currently manufacture or can manufacture round metric product sizes.

Each section will identify if the product being discussed is a converted odd dimension product or a round metric product size. All building products in this directory are made in the United States. Firms interested in being included in this directory may do so by contacting the Construction Metrication Council of the National Institute of Building Sciences, 1201 L Street, NW., Washington, DC 20005.

Air Diffusers and Grilles

Lay-in air distribution grilles and diffusers use round metric sizes. Those that are wall mounted or ceiling mounted in drywall or cut in tile may use converted dimensions. Many companies making metric sizes simply modify their existing product.

Example:

- The actual width of a nominal 24- by 24-inch (610 by 610 mm) diffuser is usually about 23-3/4 inch (604 mm).
- To produce the same product for a nominal 600 by 600 grid, each edge must be slightly shorter, or about 590 mm (23 -1/4 inch).

The following manufacturers can make round metric sizes for lay -in type applications.

- Acutherm, Emeryville, CA, a manufacturer of variable air volume air distribution devices, can manufacture its products in round metric sizes (Jim Kline, 510-428-1064).
- Aireguide, Hialeah, FL, a large manufacturer of air distribution products, can make 80 to 90 percent of its products in round metric sizes (Daryl Gray, 305-888-1631).

- Carnes, Verona, WI, one of the larger manufacturers of air distribution products, regularly makes round metric sizes (Dick Laughlin, 608-845-6411).
- Donco Air Products, Albion, IA, a small fixture manufacturer but a major manufacturer of light troffer diffusers, can manufacture light troffer, slot, and lay-in diffusers in round metric sizes up to 1 500 mm length (Ron Jansen/Marc Vandegrift, Engineering, 515 -488-2211).
- Duralast, New Orleans, LA, can make its primary diffuser product in a 600 by 600 mm variation (Ron Vinson (distributor), 504-837-2346).
- J & J Register, El Paso, TX, can make round metric sizes (Chris Smith, 915-852-9111).
- Juniper Industries, Middle Valley, NY, has previously made and can currently produce metric-size diffusers and grilles (Steve Liebermann, 718-326-2546).
- Krueger, Inc., Tucson, AZ, a large manufacturer of grilles and diffusers, has the capability to manufacture round metric sizes (Steve Bowser, 602-622-7601).
- Reliable Metal Products, Geneva, AL, a subsidiary of Hart & Cooley, is a medium-size manufacturer of air distribution products and can make about 90 percent of its products in round metric sizes (John Bowers, 205-684-3621).
- Rock Island Register, Rock Island, IL, can make its standard product, a 2- by 2-foot diffuser, in a 600 by 600 mm size (John Howarth, 309-788-5611).
- Sommerville Metalcraft, Cranfordville, IL, can produce grilles and diffusers in round metric sizes (Paul Moehling, 800-654-3124).
- Thermo Kinetics, Greenville, SC, can make its standard grilles and diffusers in round metric sizes (Terry Rutledge, 803-277-8080).
- Titus Products, Richardson, TX, a major manufacturer of air distribution grilles and products, indicates a number of products currently available in round metric sizes (Dave Loren, 214-699-1030).

Carpet

Although a few companies can make round-metric-size carpet tiles, this material may be procured by specifying other salient characteristics and allowing the competitive process to determine sizes, since all carpeting, tiles, and roll goods are cut at boundaries.

Curtainwall Systems

Curtainwall systems are obtainable in round metric sizes. Length and width of the panels are available in any size. The other dimensions are typically in converted metric.

- Kalwell Corporation, Manchester, NH, is able to produce any size metric curtainwall system (Bruce Keller, 800-258-9777).
- Kawneer Company, Norcross, GA, has been supplying curtainwall systems in metric units to foreign markets and can handle any metric order (Enrique Morales/Edward Bugg, 703-433-2711).
- Profile Systems, Gerald, MO, subsidiary of the Maune Company, can produce in any size (Grant Maune, 800-962-8100).

Doors

Domestic manufacturers produce hollow metal doors and wooden doors in any length and width desired. Round metric sizes can therefore be specified. Some firms producing round metric metal doors:

- Allied Steel Products, FL (Bill Desin, 305-624-3333).
- American Steel Products, Farmingdale, NY, can make any size metric door (Hank, 516-293-7100).
- Amweld Building Products, OH, has made and can make metric sizes (Mike Scott/Fred Bloom Jr., 216-527-4385).
- Ceco Door Division, Oak Brook, IL, a major manufacturer in the door industry, can make any round-metric-size door (Norb Bruzan, 312-242-2000).

- Duolock, Portland, OR, a division of Alumax, a major U.S. manufacturer of aluminum products, can make any size metric door (Clem Grant, 800-678-0566).
- SW Fleming, CA, MA, PA, SC (William Strong, 800-263-7515).
- Howard Industries, FL, has made and can make metric sizes (Bob Voigt/Joe Sixto, 305-888-1521).
- Republic Builders Products, TN (Jim Jackson, 901-352-3383).
- Steelcraft Manufacturing Company, OH, has been making metric sizes for export (Bill Ball/Claude Frederick, 513-745-6400).
- Tex Steel Corporation, TX (George Maldonado, 512-423-0912).

Firms producing round-metric-size wood doors:

- Eagle Plywood and Door Manufacturing, NJ (Tony Shiffano, 908-769-7650).
- Marlite, OH (Donald Sweitzer, 216-343-6621).
- Michigan Birch Door, MI, with a minimum of six doors (Roger Eger, 313-949-2020).
- Mohawk Flush Doors, PA (Don Enigk, 717-473-3557).
- Vancouver Door, WA (Gary Geppert, 206-845-9581).

Drywall

The largest drywall manufacturers either actively sell metric-size drywall or have the capability to produce it. Standard metric drywall width is 1 200 mm. Lengths are available in any size. Thicknesses are 12.7 and 15.9 mm, which correspond to English sizes. Minimum order quantities apply, but are typically about a truckload, or 700 sheets.

- Celotex, FL (George Mitchel, 813-873-4027).
- Centex American Gypsum (Lex Dominey, 800-545-6302).
- Domtar Gypsum, MI (Jim Hanser/George Shortreed, 313 -930-4700).

- Georgia Pacific, GA (Bro nwyn Dawkins, 404-521-4000).
- James Hardie Gypsum, NV (Todd Thomas, 310-787-6950/Alex Beaman, 800 -995-0950 x210).
- Temple Inland (Jim Rush, 800 -231-6060).
- USG Interiors International, Chicago, IL (William Nelson, 312-606-5383/David Vanosdall, 312-606-3804).

Elevators

All U.S. manufacturers can provide data and drawings in metric. Some product lines are produced in round metric dimensions

HVAC Controls

All of the major manufacturers of HVAC controls currently offer products that will operate in Celsius. Some of those firms are:

- Johnson Controls.
- Barber Coleman.
- Robertshaw.
- Andover.
- Honeywell.

Contact your local representative for ordering information.

Lighting Fixtures

When a round metric 600 by 600 or 600 by 1 200 ceiling grid is installed, round metric lay-in type fixture sizes must match. Many fixture manufacturers currently produce or can produce both modular metric sizes and still utilize currently used standard bulb sizes. When other than a lay-in type of lighting fixture is used in a project, then size is not critical and can be specified as an approximate size as in other equipment. The following companies produce both 600 by 600 and 600 by 1 200 fixtures unless otherwise noted.

- American Fluorescent, IL, supplies fixtures in orders of at least 500 fixtures (Gary Stabelfeldt, 708-249-5970).

- Bieber Lighting Corporation, CAS, supplies fixtures in orders of at least 50 fixtures (Bob Bieber, 800-243-2375/213-776-4744).
- C. W. Cole and Co., CA, supplies fixtures in orders of at least 20 fixtures (Frank Dayley/Jose Lopez, 818-443-2473).
- Day-O-Lite Manufacturing, RI, supplies fixtures with no minimum stated (Arthur Goldstein, 401-467-8232).
- Hasco Electric Corp., CT, supplies fixtures in orders of at least 20 (Anthony Vabaro, 203-531-9400).
- Holcor, IL, supplies fixtures in orders of 5 to 10 fixtures (Mark Nelson/Kathy Dykstra, 312-376-9780).
- Holophane, OH, supplies fixtures in orders of at least 100 fixtures (Bob Catone, 614-345-9631).
- Louisville Lamp, KY, supplies fixtures with no minimum stated (Mike Davidson, 502-964-4094).
- Lumispec, PA, supplies in orders of at least 30 fixtures (Eric Papougenis, 215-228-3830).
- Mark Lighting, NJ, supplies fixtures in orders of at least 50 fixtures (George Miller, 201-939-0880).
- Midwest Chandelier, KS, supplies in 600 by 1 200 size, in orders of at least 50 fixtures (Tom Lefkovitz/Doug Pasternak, 913-281-1100).
- Prudential Lighting, CA, supplies lensed fixtures only in orders of at least 75 fixtures (Tammy Swaim, 213-746-0360).
- Simkar Lighting, PA, supplies fixtures but has a premium on orders of less than 20 fixtures (Robert McCully, 215-831-7700).
- Solar Kinetics, TX, supplies fixtures with no stated minimum (Sandy McCrea, 214-556-2376).
- Thomas Industries Day-Bright, MS (Joe Kolarik, 601-842-7212).

- USI/Columbia Lighting, WA, supplies fixtures with no stated minimum, but is a large company (Mark Johnson/Fred Smith, 509-924-7000).
- Wellmade Metal Products, CA, supplies fixtures in orders of at least 100 (Bernie Shane, 510-562-1878).

Masonry

Many companies can make metric brick and block sizes. Unless otherwise stated, there will generally be lead time and cost impact on this product.

- Adams Products, NC, can make metric block (several hundred block orders are acceptable) (Buddy Ray, 919-467-2218/Cheryl Gaw, 919-488-4120/Betty Hughes, 919-523-5136).
- Amcor Block, UT, can make metric block (Gayland Smith, 801-295-5470).
- Basalite, CA, can supply (Jim Mayer, 916-678-1901).
- Betco Block is supplying metric block to GSA (minimum order is 150 m²) (MD, Scott Harper, 301-654-2312/NY, Steve Nagel, 518-756-2125/VA, Robert Carmody, 703-591-2770).
- Buehner Block, UT, can supply metric block (Ron Hoffmann/Kent Mortensen, 801-467-5456).
- Burns and Russell, MD (Michelle McVey, 800-638-3188).
- Clarkes Block, GA, can supply (L.E. Wells, 912-234-3436).
- Colorado Concrete Manufacturing, CO, can supply metric block (Karl Dolder/Thor Kaumeyer, (303-390-5477).
- Concrete Mold Components, CA, can supply molds (Maurice Alhadeff, 213-636-7534).
- Dagostino Building Blocks, NY (Ken Dagostino, 518-374-3116).
- Elco, PA, can produce metric block. Several hundred block orders acceptable (William Albright, 717-274-3661).

- Featherlight Building Products, TX, can produce metric block (Wade Albritton/H.V. Moss, 512-472-2424).
- Gorla Enterprises, NC, can make metric block (Ken Mayo, 919-375-5821).
- Grand Blanc Cement, MI, can supply metric block and metric molds, all shapes (Michael Hicks/Ron Hunt, 800-875-7500).
- Hagerstown Block, MD, can make metric block (301-733-3510).
- E.P. Henry, NJ, can supply hard metric block (Stephen Reale/Mariane Anzaldo, 609-845-6200).
- Adolph Jandris, MA (Tony Raila, 508-632-0089).
- Jewell Concrete Products, TX, can make metric block. Several hundred block orders are acceptable (Walter Grisham, 817-772-3440/Tom Call, 903-592-0752).
- Marquart Block, IA, can supply hard metric block (John Thiele/Scott Shimp, 319-233-8421).
- Miller Materials, MO, can make metric block (several hundred block orders are acceptable) (Charles Kreutzer, 816-444-2244).
- Mission Masonry, CO, supplied metric block to the GSA Denver facility (303-841-6089).
- Phoenix, Inc., MD (John Cissel/Don Bowers, 301-698-4010).
- Plasticrete, CT (Joe Rescigno, 800-243-6934).
- Proudfoot Corporation, CT, has made metric molds in the past, can supply metric sizes (Michael Thompson/James Loseth, 203-459-0031).
- Reading Rock, Inc., OH (Stan Bass, 513-874-2345).
- Sherman International, AL (Dannie Rodgers, 205-252-6900).
- Southern Brick & Block, VA (Ron Peters, 804-353-6681).

- Superlite Block, AZ. Several hundred block orders acceptable (John Graves, 602-352-3500).
- Trenwyth Industries, PA, makes many metric block sizes (Linda Adcock 800-233-1924).
- Tricon Enterprises, MA (Monica Maracaccio, 508-697-6112).
- Glen Gery Corporation, Wyomissing, PA, can make metric modular brick (Ron Hunsicker, Baltimore, 301-837-3170).
- Ochs Brick and Tile, Springfield, MN, can make metric modular brick (Rod Schutt, Plant Manager, 612-944-1450/Bob Larson, Sales Manager, 612-944-1450).
- U.S. Brick, Streetsville, Ontario, has 12 plants in the United States that can make metric modular brick (Ron Spencer, 416-821-8800 (Ontario)).

Since there are many U.S. brick and block manufacturers, check with your usual supplier to see if they can make the metric modular brick.

Plywood

- Amer-Ply, NJ, can supply metric sheets. No minimum order quantity (Mr. Matthew, 908-352-8111).
- Boise-Cascade, ID, has made metric before, can supply metric (Jan Blechschmidt, 206-572-8300).
- Champion International, WA, makes metric sheet sizes and thicknesses. Metric available for underlayment, sheathing, and sanded products. Metric concrete form panels can be ordered. Minimum order is one truckload (Jim DiStefano, 206-572-8300 (form panels)/Steve Williams, 206-572-8300 (plywood, western)/Jim Clark, TN, 901-731-4550 (plywood, southern)).
- Furman Lumber, MA, can supply metric from their usual suppliers (Chris Hemingway, 508-670-3800/Offices: CT, FL, GA, MD, NJ, NY, PA, TX, VA).

- Multnomah, OR, can supply 50 - 100 piece orders (Paul Brooks/Anne Snyder, 503-297-4738).
- Murphy Plywood OR, can make metric plywood (John Murphy/Mark Gryziec, 503-459-3225).
- Oregon Strand Board, OR, can make metric engineering panels, similar to plywood, at no additional cost. Minimum order is one truckload (Joe Maliszewski, 503-466-5177).
- Potlatch, WA, has exported metric, can make metric sizes (C. D. Whitney/Mac Ryerse, 509-328-0930).
- Roseburg Forest Products, OR, makes 6 - 19 mm thick plywood, can make metric sheets. Makes other metric wood building products. Minimum order is one truckload (Dave Adams/Kevin Barry, 503-679-3311).
- Stone Forest Industries, OR, currently produces both metric dimensional and thickness plywood. This firm could produce about two pressloads (about 60 sheets) minimum order but premiums would apply to small orders of this size (Lain Osborn/Tom Clow, 800-541-6906).
- Vancouver Standard has made metric sizes, can make metric sizes. Generally makes AC and higher grade (Ken Trimbell/Bill Sparks, 800-367-0038).

Raised Access Flooring

- C-TEC, Inc., Grand Rapids, MI, makes a 600 by 600 mm access flooring product line called the Metric Panel (Don Heeney, 616-243-2211).
- Interstitial Systems, Oakbrook, IL, currently manufactures a 600 by 600 mm raised floor system (Bill Collier, 708-691-8600).
- Tate Access Floors, Inc, Jessup, MD, currently produces a 600 by 600 mm access floor in light, medium, and heavy duty ratings. Generally, component unit prices are the same as English sizes (Lida Poole, 410-799-0123/Victor Sainato, 410-799-4200).
- USG Interiors/Donn, Chicago, IL, regularly makes metric access flooring in one of its four product lines (William E. Nelson 312-606-5358/David C. Vanosdall, 312 -606-3804).

Reinforcing Steel

- Atlantic Steel, GA (R.S. Mellum, 404-897-4505).
- Birmingham Steel, AL, produces metric bar in one plant and can produce it in IL, AL, and MS (Chuck James/Paul Corey, 800-677-1012; Robert Wilson/H.J. Hilton, 205-985-9290).
- Cascade Steel, OR (Glenn Peterson, 503-472-4181 x3307/Dennis Lauber).
- Florida Steel, FL, produces also in NC and TN; Don Ballard/Don Haney, 813-251-8811).
- New Jersey Steel, NJ, has made and can make metric bars (Gary Giovannetti/Elaine Skiba, 908-721-6600).
- North Star Steel, MN, has made and can make metric steel in both MN and IA (Michael Hanson, 612-688-1719/William Pepper, 612-731-5644).
- Nucor Steel, Plymouth, UT (R. Wayne Jones, 801-458-3961).
- Thomas Steel, IL, has and can make metric bar (Edward Koper/Jerry Wensel, 708-257-7701).

Steel Fabrication

Many firms have the capability of fabricating steel from metric design drawings. Some of these firms are:

- Falcon Steel, Wilmington, DE (302-571-0890).
- Havens Steel, Kansas City, MO (816-231-5724).
- Interstate Iron Works, White Horse, NJ (Robert Aberson, 908-534-6644).
- Lehigh Structural Steel, Lancaster, SC (803-286-5656).
- Montague-Betts, Lynchburg, VA (804-522-3331).
- Steelco Division, Metropolitan Steel, Sinking Spring, PA (Ron Keating, 215-678-6411).

Structural Bolts

Use metric bolt sizes in metric construction even though the steel sections are conversions. See *Structural/General* section. It is important in modern friction fittings in steel construction that bolts and holes use the same dimensioning system. Since the documents are metric, round metric avoids confusion. A benefit of using ASTM A615M sizes is that there is a reduction in the number of sizes of bolts, from nine to seven.

There are at least 20 firms that can make metric sizes. Minimum orders may be given in dollars (\$100), or by number (500) or by at least a keg. Where minimums exist they are in this range.

Suspended Ceiling Systems

Suspended ceiling systems use round metric size in full scale metric construction. Many manufacturers currently make these metric sizes.

- Armstrong World Industries, PA, currently manufactures and sells round-metric-size ceiling products. Except for selected specialty items, the major portion of the Armstrong product line has already been or can be manufactured in round metric dimensions (Dan Kennard, 717-396-2684/Deb Kantner, 717-396 3045).
- Capaul Architectural Acoustics, Plainfield, IL, a medium-sized manufacturer, can produce and bid round-metric-size projects (Tom Stanton, Baltimore MD, 410-234-0010).
- Celotex Corporation, Tampa, FL, offers an entire product line of round metric sizes (George Mitchell, 813-873-4027).
- Chicago Metallic Corp., Chicago, IL, produces round-metric-size grids (Craig Trotier, 800-323-7164).
- National Rolling Mills, Malvern, PA, regularly makes round metric sizes (Rich Mattioni, 215-644-6700).
- USG Interiors, Chicago, IL, regularly makes round-metric-size ceiling systems. Starting in 1994, this company will show all its round metric products and prices in its catalogue (William E. Nelson, 312-606-5358/David C. Vanosdall, 312-606-3804).

Systems Furniture

Systems furniture manufacturers will not all convert to metric sizes immediately. Many companies export their English-dimensioned products to countries that construct buildings in metric. These products will need their dimensions identified in metric units in product literature for ease of layout. Listed below are some firms that have product literature with metric dimensions.

- GF Furniture Systems, Inc., Youngstown, OH, currently exports its English-size panels all over the world for use in metric construction. Product literature is available with metric dimensions (Don Detweiler, 216-533-7799).
- Herman Miller, Inc., Zeeland, MI, produces both English-size and round metric-size systems furniture. Standard round metric panels are 600, 800, 1 000, 1 200, and 1 600 mm. Both the metric and the English sizes are sold outside the United States and utilized in metric construction. All Herman Miller production processes are in metric. Product literature is available with metric dimensions (Mark DeSchon, 616-772-3300).
- Steelcase, Grand Rapids, MI, currently exports its English-size products all over the world for use in metric construction. Product literature is available with metric dimensions (Ken Gilpin, 616-246-4990).

Tools

- Lufkin Tools, NC, produces metric tape measures (919-362-7511).
- Stanley Tools, New Britain, CT, manufactures metric and metric/English tape measures (Carl Lickwar/Alan G. Martin, 203-225-5111).
Model 32-158, Metric/English, 5 m/16 feet. Model 32 -156, Metric, 5 m.
Model 33-428, Metric/English, 7.5 m/25 feet. Model 33 -443, Metric, 10 m.
These can be ordered directly from Stanley or through your local hardware store.

Windows

Commercial window systems are available in round metric sizes. They are typically made specifically for a project in a wide range in small increments of size, so that they can be round metric even if the manufacturer does not call them metric..

- Alenco Commercial Group, Bryan, TX, makes aluminum metric windows primarily for export, and can make any size for domestic use (Harold Chilton, 409-823-6557).
- Andersen Windows, Commercial Group, Bayport, MN, currently fabricates windows in its one domestic plant and exports to several countries (Craig Johnson, 612-439-5150).
- Caradco, IL, can make any size round metric window (Roy Szyhowski, 217-893-4444).
- Desco Company, DeSmet, SD, can produce round metric sizes (Cindy Albrecht, 605-854-9126).
- Marmet Corporation, Wausau, WI, can make any size metric window (Brent Schepp, 715-845-5242).
- Marvin Windows, Warroad, MN, has previously manufactured and can produce windows in metric sizes (218-386-1430).
- Optimum Windows, Bronx, NY, can produce round metric sizes (Candido Perez, 212-991-0700).
- Peerless Commercial Window Division, Kansas City, MO, can make any size round metric window (Tony Grossi, 913-432-2232).
- Pella Windows, Pella, IA, can make any size metric window (Cheryl Waits, 515-628-1000).

General Information

Executive Order 12770 of July 25, 1991

(Federal Register/Vol. 56, No. 145/ Monday, July 29, 1991 / Presidential Documents, pp. 35801-3)

PRESIDENTIAL DOCUMENTS

Executive Order 12770 of July 25, 1991

Metric Usage in Federal Government Programs

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the Metric Conversion Act of 1975, Public Law 94 -168 (15 U.S.C. 205a *et seq.*) ("the Metric Conversion Act"), as amended by section 5164 of the Omnibus Trade and Competitiveness Act of 1988, Public Law 100 -418 ("the Trade and Competitiveness Act "), and in order to implement the congressional designation of the metric system of measurement as the preferred system of weights and measures for United States trade and commerce, it is hereby ordered as follows:

Section 1. Coordination by the Department of Commerce. (a) The Secretary of Commerce ("Secretary") is designated to direct and coordinate efforts by Federal departments and agencies to implement Government metric usage in accordance with section 3 of the Metric Conversion Act (15 U.S.C. 205b), as amended by section 5164(b) of the Trade and Competitiveness Act.

(b) In furtherance of his duties under this order, the Secretary is authorized:

(1) to charter an Interagency Council on Metric Policy ("ICMP"), which will assist the Secretary in coordinating Federal Government -wide implementation of this order. Conflicts and questions regarding implementation of this order shall be resolved by the ICMP. The Secretary may establish such subcommittees and subchairs within this Council as may be necessary to carry out the purposes of this order.

(2) to form such advisory committees representing other interests, including State and local governments and the business community, as may be necessary to achieve the maximum beneficial effects of this order; and

(3) to issue guidelines, to promulgate rules and regulations, and to take such actions as may be necessary to carry out the purposes of this order. Regulations promulgated by the Secretary shall function as policy guidelines for other agencies and departments.

(c) The Secretary shall report to the President annually regarding the progress made in implementing this order. The report shall include:

(1) an assessment of progress made by individual Federal agencies towards implementing the purposes underlying this order;

(2) an assessment of the effect that this order has had on achieving the national goal of establishing the metric system as the preferred system of weights and measures for United States trade and commerce; and

(3) on October 1, 1992, any recommendations which the Secretary may have for additional measures, including proposed legislation, needed to achieve the full economic benefits of metric usage.

Sec. 2. Department of Agency Responsibilities . All executive branch departments and agencies of the United States Government are directed to take all appropriate measures within their authority to carry out the provisions of this order. Consistent with this mission, the head of each executive department and agency shall:

(a) use, to the extent economically feasible by September 30, 1992, or by such other date or dates established by the department or agency in consultation with the Secretary of Commerce, the metric system of measurement in Federal Government procurement, grants, and other business -related activities. Other business-related activities include all use of measurement units in agency programs and functions related to trade, industry, and commerce.

(1) Metric usage shall not be required to the extent that such use is impractical or is likely to cause significant inefficiencies or loss of markets to United States firms.

(2) Heads of departments and agencies shall establish an effective process for a policy -level and program-level review of proposed exceptions to metric usage. Appropriate information about exceptions granted shall be included in the agency annual report along with recommendations for actions to enable future metric usage.

(b) seek out ways to increase understanding of the metric system of measurement through educational information and guidance and in Government publications. The transition to use of metric units in Government publications should be made as publications are revised on normal schedules or new publications are developed, or as metric publications are required in support of metric usage pursuant to paragraph (a) of this section.

(c) seek the appropriate aid, assistance, and cooperation of other affected parties, including other Federal, State, and local agencies and the private sector, in implementing this order. Appropriate use shall be made of governmental, trade, professional, and private sector metric coordinating groups to secure the maximum benefits of this order through proper communication among affected sectors.

(d) formulate metric transition plans for the department or agency which shall incorporate the requirements of the Metric Conversion Act and this order, and which shall be approved by the department or agency head and be in effect by November 30, 1991. Copies of approved plans shall be forwarded to the Secretary of Commerce. Such metric transition plans shall specify, among other things:

(1) the total scope of the metric transition task for that department or agency, including firm dates for all metric accomplishment milestones for the current and subsequent fiscal year;

(2) plans of the department or agency for specific initiatives to enhance cooperation with industry, especially small business, as it voluntarily converts to the metric system, and with all affected parties in undertaking the requirements of paragraph (a) of this section; and

(3) specific steps and associated schedules through which the department or agency will seek to increase understanding of the metric system through educational information and guidance, and in department or agency publications.

(e) designate a senior -level official as the Metric Executive for the department or agency to assist the head of each executive department or agency in implementing this order. The responsibilities of the Metric Executive shall include, but not be limited to:

(1) acting as the department's or agency's policy -level representative to the ICMP and as a liaison with other government agencies and private sector groups:

(2) management oversight of department or agency outreach and response to inquiries and questions from affected parties during the transition to metric system usage; and

(3) management oversight of preparation of the department's or agency's metric transition plans and progress reports, including the Annual Metric Report required by 15 U.S.C. 205j and OMB Circular A -11.

(4) preparation by June 30, 1992, of an assessment of agency progress and problems, together with recommendations for steps to assure successful implementation of the Metric Conversion Act. The assessment and recommendations shall be approved by the head of the department or agency and provided to the Secretary by June 30, 1992, for inclusion in the Secretary's October 1, 1992, report on implementation of this order.

Sec. 3. *Application of Resources.* The head of each executive department and agency shall be responsible for implementing and applying the necessary resources to accomplish the goals set forth in the Metric Conversion Act and this order.

Sec. 4 *Judicial Review.* This order is intended only to improve the internal management of the executive branch and is not intended to create any right or benefit, substantive or procedural, enforceable at law by a party against the United States, its agencies, its officers, or any other person.

< signature of President >

THE WHITE HOUSE,
July 25, 1991 .

[FR Doc. 91-18028
Filed 7-25-91; 3:06 pm]
Billing code 3195 -01-M

AGC Letter to Metrication Operating Committee

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA

1957 E Street N.W. Washington, D.C. 20008 (202) 393 -2040 FAX (202) 347 -4004

MARVIN M. BLACK, President ROBINS H. JACKSON, Senior Vice President

BYRON L. FARRELL, Vice President LAWRENCE J. MCGOUGH, Treasurer

HUBERT BEATTY, Executive Vice President

Mr. Thomas R. Rutherford, P.E.
Chairman, Construction Subcommittee
Metrication Operating Committee
5901 Leesburg Pike, Skyline 6, Suite 310
Falls Church, VA 22041

Dear Tom:

Thank you for your fine presentations on "Federal Metrication Efforts" to the Federal Building Procedures and Project Delivery Systems Committees in Asheville, North Carolina. You will be pleased to know that both committees plus the Building Division Steering Committee strongly endorse your efforts, in fact, urge you to pick up the pace of metric conversion. The committee recommendations are consistent with AGC national policy which states unequivocally:

"Recognizing the inevitability of the nation eventually adopting the metric system, AGC endorses the consensus statement of the American Metric Council that, "If the industry is to go metric, a hard conversion is recommended where there is an economic advantage."²¹ AGC supports an orderly conversion to the metric system at the earliest practical date."³²

We look forward to working with you and the Metrication Operating Committee in achieving total conversion within your timetable. As you put it so succinctly, metric is the language of 93% of the world's population, only the U.S. remains in inch/pound. If we are to protect and develop global markets, we must speak the same language.

Sincerely,

<signature of Director>

William J. Angelo
Director
Building Division

Note: ²¹ Metric Conversion Committee Meeting Report, September 16, 1977

³² Metric Committee Report to Board, March 17, 1981

cc: Robert F. Lathlaen
J. Howard Mock
Thomas J. McGough
J. Doug Pruitt

Recommended Preparation

Governmental Organizations

- Provide this guide to staff and architectural/engineering (A/E) firms.
- Place CBD advertisements in metric format. See *A/E-CM CBD Guidance* section.

Private Design Firms

- Contact product suppliers for metric product literature. If not available, request it be developed, even as a supplement to existing material. Research for competitive sources of materials specified must be performed just as it is for English-dimensioned documents.
- U.S. Government selection of design firms will increasingly emphasize firms with metric capabilities.
- Obtain important design documents: ASTM E380, ASTM E621, Graphic Standards (Eighth Edition), AISC LRFD Steel Data (Metric Version), ACI 318M Building Code (metric), and the ASHRAE SI metric version handbooks.

Product Manufacturers

- Develop metric product literature. Most products in use today will not undergo any physical change during the metric transition. However, they will be specified only in metric dimensions on Federal projects.
- Metric product literature may be as simple as bond paper supplements, with metric dimensions, attached to existing material.
- Products identified herein as hard metric products have been researched and are competitively available today. Manufacturers of these products may wish to coordinate with trade groups to develop new standard metric sizes and use this as an opportunity to reduce product variations. Many other countries have done this as metric was implemented.

Metric Projects

Some round metric products have minimum order quantities which may limit them to a project involving renovation of a floor or more of a building. Individual projects must be evaluated by managers for scope and size in planning them. Most products, however, are identical to the English-dimensioned products and can be used on any project. A modification of an entire building or a new building project has a large enough buying power and trade learning curve that all products in this guide may be used without extraordinary research.

Computer-aided drafting (CAD) has simplified execution of metric renovation projects, since drawings can be digitized in English dimensions and converted to metric scale. However, professional rounding must still be done after conversion. In major renovations, new round metric sizes can be installed, such as an entire new 600 by 600 mm ceiling system, even if the original module was different. Many historical buildings do not fit any module.

Do not control HVAC in one part of a building using Celsius temperature, while another part retains Fahrenheit. An entire building should be switched at once. A building temperature system can be converted to Celsius with no cost impact today, since modern digital HVAC control equipment has either degrees C or F as a software option.

Small Projects

On some smaller size metric design and construction projects, contractors converted drawings and specifications done completely in metric dimensions back to English dimensions. In a few cases the contractor made mistakes in translation, one of them resulting in the wrong size steel columns being delivered to the job site. Contractors should be cautioned at the preconstruction meeting not to do this, as such errors are at their expense. Projects below \$1 - 2 million have been successfully completed in round metric, but they should be carefully reviewed so issues such as minimum order quantities do not have a large effect on time and cost.

A/E-CM CBD Guidance

Commerce Business Daily (CBD) advertisements for A/E or construction management (CM) solicitations should use the following terminology.

- State the area of the project in square meters only.

Example: The new building will be approximately 15 000 occupiable square meters of office and storage space.

- Each announcement should state: "This project will be designed and built entirely in metric units."
- For A/E firm announcements, including term contract announcements, the following should be added as an evaluation factor: "Familiarity with metric system and ability to design in metric units."

Note: Do not yet mandate metric experience. While many firms have substantial metric experience, many excellent design firms have not yet had a metric design opportunity.

- For CM announcements, including term CM announcements, the following should be added as an evaluation factor: "Familiarity with metric system and ability to perform required services in metric units."

Each Request For Proposal (RFP) shall require a summary of the firm's metric experience, its experience with the metric system, and its ability to perform required services in metric units.

Construction CBD Guidance

Use the following terminology for each CBD advertisement for construction projects designed in metric.

- Show the area of the project in metric dimensions only:

Example: "This project involves the renovation of a 24 000 gross square meter (GSM) building."

- State: "This project has been designed completely in metric units. All testing will use metric units. Shop drawings and product literature must be submitted with metric dimensions. Supplements to existing product literature will be accepted on bond paper."

A/E-CM Scope Guidance

The following terminology is recommended for insertion into each A/E scope of work.

Metric Measurement . Measurements and units of any type, on all submissions of this project, shall be shown in SI metric units exclusively. English system measurements shall not

appear in reports, drawings, specifications, or any other submissions. A/E firms must strive to utilize as many round metric products as possible.

- All cost estimating should be submitted in metric units only.
- All correspondence should be written in SI units exclusively.
- Submit shop drawings, catalog cuts, and other construction phase material in metric units.
- Submit all operation and maintenance manuals in metric units.

Specification Guidance

Based on metric project experience, terminology similar to the following three paragraphs should be included in Division One of the construction specification.

"During the prebid and/or preconstruction conference, a session will be specifically devoted to metric. GSA or its representatives will explain that most products specified are the same products contractors are currently using, only specified in metric dimensions. Modular metric products used on the project will be identified and discussed. Contractors will be cautioned that they should ask suppliers about delivery schedules on modular and round metric products, and not assume they are the same as English-dimensioned ones. Contractors should ensure that all workers are using metric tapes and not trying to convert to English at every measurement.

"All correspondence must use SI metric units exclusively. All cost data submitted by the contractor in a proposal or any other submission must be in metric units. All shop drawings, catalog cuts, and other submittals must be submitted with metric units and dimensions that clearly demonstrate conformance with the metric units given in the drawings and specifications. Metric supplements to existing product literature or data will be accepted on bond paper.

"All operations and maintenance (O&M) material must be submitted with metric units and dimensions that clearly demonstrate conformance with the metric units given in the drawings and specifications. Metric supplements to existing O&M material will be accepted on bond paper."

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ATTACHMENT NO. 8

**PLANT SPECIES PALETTE FOR
SCHRIEVER AFB**

MASTER PLANT LIST

(As Provide By Base)

SHADE TREES:

Hackberry
Patmore Green Ash
Summit Green Ash
Marshall Green Ash
Shademaster Honeylocust
Skyline Honeylocust
Western Catalpa
Kentucky Coffee Tree
Black Walnut
Bur Oak
Black Locust

Celtis occidentalis
Fraxinus pennsylvanica 'Patmore'
Fraxinus pennsylvanica 'Summit'
Fraxinus pennsylvanica 'Marshall'
Gleditsia triocanthos inermis 'Shademaster'
Gleditsia triocanthos inermis 'Skyline'
Catalpa speciosa
Gymnocladus dioica
Juglans nigra
Quercus macrocarpa
Robinia pseudoacacia

ORNAMENTAL TREES:

Golden Raintree
Amur Chokecherry
Russian Olive
Shubert Chokecherry
Scrub Oak
Washington Hawthorn
Downy Hawthorn
Cockspur Hawthorn
English Hawthorn
Russian Hawthorn
Wahsatch Maple

Koeleruteria paniculata
Prunus maackii
Eleagnus angustifolia
Prunus virginiana 'Shubert'
Quercus gambelii
Crataegus phaenopyrum
Crataegus mollis
Crataegus crusgalli
Crataegus laevigata
Crataegus ambigua
Acer grandidentatum

EVERGREEN TREES:

Bristlecone Pine
Pinon Pine
Rocky Mtn. Juniper
Ponderosa Pine
Cologreen Juniper

Pinus aristate
Pinus edulis
Juniperus scopulorum
Pinus ponderosa
Juniperus scopulorum 'Cologreen'

DECIDUOUS SHRUBS (Large):

Silverberry
Sea Buckthorn
Rock Spirea
Silver Buffaloberry
Native Chokecherry
Lilac
Siberian Pea Shrub
American Plum
New Mexico Privet
Sage
Staghorn Sumac
Smooth Sumac
Mountain Mahogany
Curlyleaf Mahogany

Elaeagnus commutata
Hippophae rhamnoides
Holodiscus dumosus
Shepherdia argentea
Prunus virginiana melancarpa
Syringa vulgaris
Caragana aborescens
Prunus americana
Forestiera neo-mexicana
Artemisia tridentata
Rhus tyhina
Rhus glabra
Cercocarpus montanus
Cercocarpus ledifolius

DECIDUOUS SHRUBS (Large)CONT...

Common Ninebark	<i>Physocarpus opulifolius</i>
Utah Serviceberry	<i>Amelanchier utahensis</i>
Saskatoon Serviceberry	<i>Amelanchier alnifolia</i>

DECIDUOUS SHRUBS (Medium):

Antelope Bush	<i>Purshia tridentata</i>
Apache Plume	<i>Fallugia paradoxa</i>
Korean Barberry	<i>Berberis koreana</i>
Western Sand Cherry	<i>Prunus bessei</i>
Fernbush	<i>Chamaebatia millefolium</i>
Rabbitbrush	<i>Chrysothamnus nauseosus albicaulis</i>
Moonlight Broom	<i>Cytisus scoparius 'Moonlight'</i>
Threeleaf Sumac	<i>Rhus trilobata</i>
Alpine Currant	<i>Ribes alpinum</i>
Yellow Flowering Currant	<i>Ribes aureum</i>

DECIDUOUS SHURBS (Small):

Lead Plant	<i>Amorpha canescens</i>
Fragrant False Indigo	<i>Baptisia australis</i>
Redleaf Barberry	<i>Berberis thunbergii</i> var. <i>atropurpurea</i>
Pygmy Pea Shrub	<i>Caragana pygmaea</i>
Blue Mist Spirea	<i>Caryopteris x clandonensis</i>
Dwarf Blue Rabbitbrush	<i>Chrysothamnus nauseosus nauseosus</i>
Lena Broom	<i>Cytisus x 'Lena'</i>
Russian Sage	<i>Perovskia atriplicifolia</i>
Native Ninebark	<i>Physocarpus monogynus</i>
Potentilla	<i>Potentilla fruticosa</i>
Squaw Currant	<i>Ribes cereum</i>
Redshrub Rose	<i>Rosa x 'Adelaide Hoodless'</i>
Bonica Rose	<i>Rosa x 'Bonica'</i>
Austrian Copper Rose	<i>Rosa foetida 'Bicolor'</i>
Persian Yellow Rose	<i>Rosa foetida 'Persiana'</i>
Hancock Coralberry	<i>Symphoricarpos x chenaulti 'Hancock'</i>
Yucca	<i>Yucca baccata</i>
Soapweed	<i>Yucca glauca</i>

EVERGREEN SHRUBS:

Mugo Pine	<i>Pinus mugo</i>
Armstrong Juniper	<i>Juniperus chinensis 'Armstrong'</i>
Greenmound Juniper	<i>Juniperus procumbens 'Greenmound'</i>
Holbert Juniper	<i>Juniperus chinensis 'Holbert'</i>
Sea Green Juniper	<i>Juniperus chinensis 'Sea Green'</i>
Blue Chip Juniper	<i>Juniperus horizontalis 'Blue Chip'</i>
Hughes Juniper	<i>Juniperus horizontalis 'Hughes'</i>
Wilton Carpet Juniper	<i>Juniperus horozontalis 'Wiltonii'</i>
Arcadia Juniper	<i>Juniperus sabina 'Arcadia'</i>
Buffalo Juniper	<i>Juniperus sabina 'Buffalo'</i>
Calgary Carpet Juniper	<i>Juniperus sabina 'Cargary Carpet'</i>
Scandia Juniper	<i>Juniperus sabina 'Scandia'</i>
Tammy Juniper	<i>Juniperus sabina 'Tamariscifolia'</i>

EVERGREEN SHRUBS CONT...

Table Top Blue Juniper

Juniperus scopulorum 'Table Top Blue'

PERENNIALS:

Blanket Flower
Daylily
Bearded Iris
Penstemon
California Poppy
Red Hot Poker
Santolina
Yarrow
Sage
Gay Butterfly
False Indigo
Chocolate Flower
Poppy Mallow
Bluebells
Dwarf Coreopsis
Ice Plant
Sulfur Flower
Wallflower
Spurge
Snakeweed
Baby's Breath
Sunrose
Lavender
Flax
Aster
Bee Balm
New Mexico Primrose
Speedwell
Hummingbird Flower

Gaillardia aristata
Hemerocallis
Iris hybrids
Penstemon sp.
Eschscholzia californica
Kniphofia uvaria
Santolina chamuecyparissus
Achillea millefolium
Artemisia schmidtiana
Asclepias tuberosa
Baptisia australis
Berlandiera lyrata
Callirhoe involucrata
Campanula cochlearifolia
Coreopsis auriculata nana
Delosperma nubigenum
Eriogonum umbellatum
Erysimum asperum
Euphorbia apithymoides
Gutierrezia sarothrae
Gypsophila paniculata
Helianthemum nummularium
Lavandula angustifolia
Linum perenne
Machaeranthera bigelovii
Monarda didyma
Oenothera berlandieri
Veronica sp.
Zauschneria californica latifolia

GROUNDCOVERS:

Featherleaf Penstemon
Border Jewel
Fleece Flower
Pussytoes
Sedum
Wild Strawberry

Penstemon pinifolius
Polygonum affine
Polygonum reynoutria
Antennaria rosea
Sedum
Fragaria americana

ORNAMENTAL GRASSES:

Blue Fescue Grass
Blue Avena Grass
Maidengrass
Ribbon Grass
Dwarf Fountain Grass

Festuca ovina glauca
Helictotrichon sempervirens
Miscanthus sinensis gracillimus
Phalaris arundinacea 'Picta'
Pennisetum alopecuroides 'Hamelin'

GRASS:

Kentucky Bluegrass
Fescue Sod
Buffalo Grass
Prairie Meadow Mix
Dryland Seed Mix

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ATTACHMENT NO. 9

PAVEMENT CALCULATION SHEETS

RIGID PAVEMENT DESIGN

(Non-Reinforced)

(The use of this form does not preclude compliance with all requirements of AFM 88-7, Chap. 1 and AFM 88-7, Chap. 5)

1. STRENGTH DESIGN.

1.1. Class = ____ (Table 1 or 2 in AFM 88-7, Chap. 5)

1.2. Category = ____ (Chapter 3 of AFM 88-7, Chap. 1)

1.3. Design Index = ____ (Table 3-1 of AFM 88-7, Chap. 1)

1.4. Modulus of Soil Reaction (Subgrade)= k = ____ pci (If test results are not available, refer to Table 9-1 of AFM 88-7, Chap. 1, for typical values).

1.5. Concrete 28-day flexural strength = ____ psi (650 psi)

1.6. If a base course is not required under rigid pavement, pavement thickness shall be determined using the subgrade modulus of soil reaction, k.

Pavement Thickness = ____ inches (Figures 12-1 and 12-2 of AFM 88-7, Chap. 1)

1.7. If a base course is required under rigid pavement; pavement thickness shall be determined using the following interactive process whereby the total base course thicknesses are assumed and the effective modulus of soil reaction on top of the base is determined. Effective K values are used to determine the required pavement thickness.

<u>Trial</u> <u>Number</u>	<u>Assumed Base</u> <u>Course Thickness</u>	<u>Effective</u> <u>Soil Reaction</u> <u>(Fig. 9-1 of</u> <u>AFM 88-7, Chap. 1)</u>	<u>(**) Pavement</u> <u>Thickness</u> <u>(Fig. 12-1 or</u> <u>Fig. 12-2 of</u> <u>AFM 88-7, Chap. 1</u>
1			
2			
3			
4			

(**) Effective Soil Reaction from Fig. 9-1 of AFM 88-7, Chap. 1, will be used for the K value in Figure 12-1 or 12-2.

RIGID PAVEMENT DESIGN
(Non-Reinforced)

Pavement Thickness = ____ inches

Total Base Course Thickness = ____ inches *

* Note: The minimum base course thickness is 4 inches.

1.8 Compacted Subgrade Thickness = ____ inches (Chapter 9 of AFM 88-7, Chap. 1)

2. FROST DESIGN.

2.1. Reduced Subgrade Strength Method. (Exception from the full thickness requirements of the limited subgrade penetration design method is not permitted where subgrade soils are group F4 under adverse moisture conditions.)

2.1.1. Design Index = ____ (from paragraph 1.3. above)

2.1.2. Concrete 28-day flexural strength = ____ psi (from paragraph 1.5. above)

2.1.3. Soil Group = ____ (From Soils Report or Table 18-2 of AFM 88-7, Chap. 1)

2.1.4. The following is an interactive process whereby the total base course thicknesses are assumed and frost-area indices of reaction are determined. These values are used to determine the required pavement thickness. In no case should the frost-area index of reaction exceed the value of K in paragraph 1.4. used for the strength design.

<u>Trial</u> <u>Number</u>	<u>Assumed Base</u> <u>Course Thickness</u>	<u>Frost-area Index</u> <u>of Reaction</u> (Fig. 18-5 of AFM 88-7, Chap. 1)	(**) <u>Pavement</u> <u>Thickness</u> (Fig. 12-1 or Fig. 12-2 of AFM 88-7, Chap. 1)
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1
2
3
4

(**) Frost-area Index of Reaction from Fig. 18-5 of AFM 88-7, Chap. 1, will be used for the K value in Figure 12-1 or 12-2.

Pavement thickness = ____ inches.

Total Base Course Thickness = ____ inches.

RIGID PAVEMENT DESIGN
(Non-Reinforced)

Note: The values above should represent the least expensive combination of base course and pavement thicknesses shown in the Table in paragraph 2.1.4. above. The combined thickness of all base courses shall be at least equal to the slab thickness, except as outlined in paragraph 18-7 (b) of AFM 88-7, Chap. 1. The minimum base course thickness is 4 inches.

2.1.5 Depth of Subgrade Preparation = ____ inches
(Para 18-17 of AFM 88-7, Chap. 1).

If existing subgrade soils are relatively homogeneous with uniform frost susceptibility or the exceptions in paragraph 18-17a of AFM 88-7, Chap. 1 are applicable, the subgrade requirements in paragraph 18-17 of AFM 88-7, Chap. 1 shall not be required. The compacted subgrade thickness shall be in accordance with Chapter 9 of AFM 88-7, Chap. 1.

3. **FINAL PAVEMENT SECTION**. The Strength Design method shall be used to determine the final pavement design in areas with non-frost-susceptible subgrade soils and in areas where frost will not penetrate into the subgrade. For all other areas, the final pavement design shall be determined using the greater pavement thickness obtained by either the Strength Design method or the Frost Design method.

Concrete Pavement thickness = ____ inches. (6" min.)

Rigid Base Course Thickness = ____ inches. (4" min.)

Compacted Subgrade Thickness = ____ inches.

FLEXIBLE PAVEMENT DESIGN

(The use of this form does not preclude compliance with all requirements of AFM 88-7, Chap. 1 and AFM 88-7, Chap. 5).

1. STRENGTH DESIGN.

1.1. Class = ____ (Table 1 or 2 in AFM 88-7, Chap. 5)

1.2. Category = ____ (Chapter 3 of AFM 88-7, Chap. 1)

1.3. Design Index = ____ (Table 3-1 of AFM 88-7, Chap. 1)

1.4. CBR (compacted subgrade) = ____ (If test results are not available, refer to Page 8-3 of AFM 88-7, Chap. 1, for typical values)

1.5. Design Thickness = ____ inches (Figure 8-1 of AFM 88-7, Chap. 1)

1.6. Compacted Subgrade Thickness = ____ inches (Table 4-1 of AFM 88-7, Chap. 1)

2. FROST DESIGN.

2.1. Reduced Subgrade Strength Method. (Exception from the full thickness requirements of the limited subgrade frost penetration design method is not permitted where subgrade soils are group F4 under adverse moisture conditions.)

2.1.1. Design Index = ____ (From paragraph 1.3. above)

2.1.2. Soil Group = ____ (From Soils Report or Table 18-2 of AFM 88-7, Chap. 1)

2.1.3. Soil Support Index = ____ (Table 18-3 of AFM 88-7, Chap. 1)

2.1.4. Design Thickness (**) = ____ inches (Figure 8-1 of AFM 88-7, Chap. 1)

(**) Soil Support Index from Table 18-3 of AFM 88-7, Chap. 1, will be used for the CBR value in figure 8-1.

FLEXIBLE PAVEMENT DESIGN

2.1.5 Depth of Subgrade Preparation = ____ inches (Para 18-17 of AFM 88-7, Chap. 1).

If existing subgrade soils are relatively homogeneous with uniform frost susceptibility or the exceptions in paragraph 18-17a of AFM 88-7, Chap. 1 are applicable, the subgrade requirements in paragraph 18-17 of AFM 88-7, Chap. 1 shall not be required. The compacted subgrade thickness shall be in accordance with Chapter 4 of AFM 88-7, Chap. 1.

3. **FINAL PAVEMENT SECTION.** The Strength Design method shall be used to determine the final pavement design in areas with non-frost-susceptible subgrade soils and in areas where frost will not penetrate into the subgrade. For all other areas, the final pavement design shall be determined using the greater pavement thickness obtained by either the Strength Design method or the Frost Design method.

Bituminous Surface Course thickness = ____ inches. (2" min.)

Bituminous Tack Coat

Bituminous Intermediate Course = ____ inches. (2" min.)

Bituminous Prime Coat

Aggregate Base Course Thickness = ____ inches. (4" min.)

Subbase Course Thickness = ____ inches. (4" min.)

Compacted Subgrade Thickness = ____ inches.

ATTACHMENT NO. 10

DRAWINGS (RFP AND SURVEY)

RFP DRAWINGS FOR MEDICAL/DENTAL CLINIC, SCHRIEVER AFB, COLORADO

These drawings (Sourceview.cals format) are included on the CD-ROM with the solicitation requirements.

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